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THERAPEUTIC USE OF A MODELLING TECHNIQUE WITH SEVERELY DEVIANT CHILDREN

by

© RHEVA FRANK

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

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MASTER OF SCIENCE

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FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled THERAPEUTIC USE OF A MODELLING TECHNIQUE WITH SEVERELY DEVIANT CHILDREN submitted by Rheva Frank in partial fulfilment of the requirements for the degree of Master of Science.

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ABSTRACT

Four severely deviant children from the Edmonton School for Autistic Children were subjects in a study designed to determine whether they would imitate the form of play they had observed on a video monitor. For this purpose videotapes were prepared using the subjects as the models. Two of the subjects were assigned to each of two different play activities. Following preliminary observations the experiment was conducted over a three-week period. During the first week the subject viewed either himself (self modelling) or the other subject (other model) modelling the same acts with the same toy. The conditions were reversed during the second week and the conditions which had prevailed during the first week were reinstated for the third week.

Imitation did not occur to any significant extent. The modelling procedure did however, appear to increase the time that the subjects were involved with the target toy. Contrary to expectations other models seemed more effective in initiating non-imitative play. Despite the initiation of non-imitative play the failure to induce accurate reproduction of the modelled acts combined with the large amounts of therapy time involved lead one to

conclude that this is not a valuable clinical approach to the treatment of such children.

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INTRODUCTION

Development of the Concept of Early Infantile Autism

"Early infantile autism" is a diagnostic category introduced into the realm of psychiatric nosology by Leo Kanner in 1944 while he was director of the Child Psychiatry Clinic at Johns Hopkins Hospital (Kanner, 1944). The previous year, in the paper "Autistic Disturbances of Affective Contact," he had published case histories of eleven children whom he grouped into this category - "early infantile" because the children had apparently been deviant "from the beginning of life" and "autistic" because of their aloofness and lack of approach behavior toward people (Kanner, 1943).

Also in 1944 Asperger published "Die autistichen Psychopathen in Kindesalter" in which he reported instances of children who were "autistic psychopaths." His description of autistic psychopathy differed significantly from Kanner's concepts. Asperger's children were described as being less sensitive than normal but were more than normally rational, meaning that they were incapable of anticipating or interacting with the feelings of other people, of easy verbal exchange, of use or comprehension of words in a nonliteral sense. Their language tended to be formal, fluent and even elegant, but more appropriate to formal speeches than to colloquial

banter. They experienced great difficulty in learning from other people even when instruction was largely verbal and literal, preferring to work out original solutions and methods. They were characterized by deficient spatial perception which made them unable to participate adequately in many children's games. Further, they frequently became engrossed in unusual independent interests such as the study of genealogy or of highly abstract questions which served to further their isolation from their peers. In sum, Asperger's autistic children were not psychotic: his description is merely a constellation of personality traits. Asperger's "autistic psychopathy" has been granted a richly-merited oblivion.

Kanner's autistic children were clearly psychotic. Their speech was either absent, grossly retarded or marked by characteristic abnormalities such as echolalia, pronominal reversal and/or expressionless, parrotlike voices. Communicative language failed to develop. Repetition of stereotypic motor acts such as twirling, hand flapping or rocking occupied these children for hours. Normal play was lacking. Normal social interaction with peers or adults was absent. Feeding problems were common with some children subsisting on exceedingly limited and nutritionally deficient diets. Kanner however spoke of "islets" of normal or even superior intelligence, an example of which was exceptional memory for spatial orientation of objects and an

insistence that the positions remain unchanged.

In May of 1960, in a vain attempt to bring a semblance of order to the diagnostic features of "the schizophrenic syndrome in childhood" a working party under the chairmanship of Dr. Mildred Creak was formed in Britain (Creak et al., 1961).

Nine diagnostic points were selected as characteristic of psychotic children but "These nine points were not intended as absolute criteria in the sense that all, or any particular one, must be present; nor were they designed for use as a rating scale." The nine points were:

1. Gross and sustained impairment of emotional relationships with people.
2. Apparent unawareness of his own personal identity to a degree inappropriate to his age.
3. Pathological preoccupation with particular objects or certain characteristics of them, without regard to their accepted functions.
4. Sustained resistance to change in the environment and a striving to maintain or restore sameness.
5. Abnormal perceptual experience (in the absence of discernible organic abnormality) implied by excessive, diminished, or unpredictable response to sensory stimuli - for example, visual and auditory avoidance (see also points 2 and 4), or insensitivity to pain and temperature.

6. Acute, excessive and seemingly illogical anxiety.

7. Speech may have been lost, or never acquired, or may have failed to develop beyond a level appropriate to an earlier stage.

8. Distortion in mobility patterns - e.g., (a) excess as in hyperkinesis; (b) immobility as in katatonia; (c) bizarre postures, or ritualistic mannerisms, such as rocking and spinning (themselves or objects).

9. A background of serious retardation in which islets of normal, near normal or exceptional intellectual function or skill may appear.

In April of 1964, a "Further Progress Report of a Working Party" was published (Creak et al., 1964). They reported a new awareness of ambiguity in the Points and with the difficulty in deciding how a point should be marked when the behavior from which it was inferred had occurred in the past but was no longer in evidence. The question was also raised regarding the scoring where the behavior appeared in certain settings but not in others. They had originally tried to confine themselves to descriptions of observable behavior rather than interpretations based upon such behavior but "This proved to be impossible if we were to convey what we all felt to be the heart of the matter - namely, the presence of an impaired capacity for human relationships, which observation alone, however acute, cannot discover." They were thus in agreement with Kanner as to "the heart of the

matter" although neither Kanner nor the Working Party was willing to accept this impairment as the necessary and sufficient condition.

Serious questions arose in the minds of the members of the Working Party concerning the reliability of scoring by various respondents. Some 190 children were assessed by the respondents using their own various interpretations of the Nine Points. From this group the members of the Working Party eliminated 77 cases because the diagnosis seemed too uncertain. The remaining 113 cases were classified according to four diagnostic categories as follows:

A. Schizophrenic syndrome without organic features with 29 cases.

(N.B. The authors actually listed 129 cases in this category. This is presumably a typographical error because this figure would result in a total of 213 cases.)

B. Schizophrenic syndrome with organic features with 26 cases.

C. Organic features without schizophrenic syndrome with 34 cases.

D. Neither organic features nor schizophrenic syndrome with 24 cases.

For each diagnostic category the percentage of cases showing each of the Nine Points was computed. No attempt

was made to determine the reliability of categorization of the cases nor was any question raised concerning the validity of the categories used.

Point 1, "impairment of emotional relationships," was considered by the members of the Party as a possible means which "might help to distinguish some of the 'organic cases' from the 'schizophrenic'." This interpretation appears to be a confounding of their results as 96% of the cases classed as schizophrenic syndrome with organic features scored positive on this point as did 98% of the cases which were categorized as schizophrenic syndrome without organic features. In contrast, a smaller precentage of non-schizophrenics, either with or without organic features, scored positively for this Point (44% and 66% respectively).

The findings regarding Point 1, "impairment of emotional relationships," was the major difference considered to have been discovered by the Working Party. Although percentage differences were found among the other Points, no clear trend was evident and they made no attempt to determine any objective diagnostic profile based upon the Nine Points. Some discrepancies appear between the tabulated data and a graph presumably based on these data making it difficult for the reader to assess their findings adequately.

The Working Party was characterized by its use of a

generic term "schizophrenic syndrome in childhood." There is no evidence of their having considered any subcategories or of their being aware of any controversy among proponents of "early infantile autism" (Kanner, L., 1943), "atypical development" (Rank, B., 1949), "symbiotic psychosis" (Mahler, M.S., 1952), "dementia praecocissima" (De Sanctis, S., 1906), "pseudo-schizophrenia" (Rank and Kaplan, 1951), "pseudopsychopathic schizophrenia" (Bender, L., 1956), "pseudosymptomatic retardation" (Gesell, A., 1928), "dementia infantilis" (Heller, T., 1930), "childhood schizophrenia" (Potter, H., 1933) and "nuclear schizophrenia" (Bender, L., 1942) among other diagnostic labels which might have been assigned to a child.

Clancy, Dugdale and Rendle-Short (1969) continued the task of the Working Party, attempting to refine the nine-point scale to determine:

"(1) which symptoms, as interpreted by the parent, are characteristic of the syndrome of infantile autism,

(2) whether the syndrome can be distinguished as a separate entity, and

(3) more efficient diagnostic criteria than those at present in use."

They drew up 14 "major manifestations" and suggested that the presence of any 7 or more of them constituted autism. The characteristics cited were:

1. difficulty mixing with other children.
2. acts as deaf.

3. resists any learning.
4. no fear of real dangers.
5. resists routine change.
6. indicates needs by gestures.
7. inappropriate laughing and giggling.
8. not cuddly.
9. marked physical overactivity.
10. no eye contact.
11. inappropriate attachment to objects.
12. spins objects.
13. sustained odd play.
14. standoffish manner.

Under this scheme it is possible for a child to lack motor imitation, be echolalic or mute, be self destructive, engage in bizarre mannerisms, display violent and sustained tantrums frequently, fail to show awareness of people and yet not be autistic. Many of the items listed overlap such as manifestations 11, 12, 13 and manifestations 8 and 14. Manifestation 6 differs strikingly from other descriptions of autistic children in its admission of language, albeit gestural. Surprisingly, no mention is made of the poverty of spoken communicative language or of its characteristics such as pronominal reversal and echolalia.

In addition to efforts by groups, several individuals working in this area have attempted to define this

diagnostic category. Notable among these are M. Rutter and I. Lovaas.

Rutter (1972) argues that autism is basically a central cognitive disorder involving symbolic language function. He believes that this defect comprises both the necessary and the sufficient basis for the development of the autistic syndrome. Studies conducted by Rutter and his associates (Rutter and Bartak, 1971; Bartak, Rutter and Cox, 1972) compare autistic children having no other discernible handicaps and of normal intelligence with children diagnosed as having a developmental receptive language disorder. They concluded "that autism <u>can</u> and does develop in children with a severe and global language impairment but of normal ability on visuo-spatial tasks and without any overt perceptual handicap" (Rutter, 1972). This is not to imply that the afflicted children may not also suffer from other handicaps such as mental retardation, physiological disorders, or unfavourable environmental situations. It is these 4 factors: the clinical psychiatric syndrome, the intellectual level, biological disorders, and psychosocial influences which constitute the four axes of the multi-axial classification system proposed by the Fifth World Health Organization Seminar on Psychiatric Diagnosis, Classification and Statistics (Rutter et al., 1969; Tarjan et al., 1972).

Impairment of language function must involve more

than defective speech. It necessarily involves defective comprehension as well as production of sounds and gestures. Skills which normally precede speech and are either an integral part of it or are associated intimately with its development are also implicated and either should be lacking totally or at least seriously deficient. Such skills include babble, imitation of simple overt motor acts as well as imitation of speech sounds, representational play, and appropriate use of objects.

In his review of research on autism Rutter (1968) simplified a scheme of classification of psychotic disorders presented by Eisenberg (1967). Rutter suggested that there were three major groups of psychotic disorders found among children and that age of onset provides a simple means of differentiating among them. First was the group of children like those described by Kanner in 1943. Their disorder began in infancy as a rule but might not be manifested until the second, or rarely even the third year of life. Rutter (1971) set a maximum age of onset of the disorder at 30 months. The second group of psychotic children developed normally until age three to five and then, possibly after an illness, they lost speech, toilet training, generally regressed and may have become markedly overactive. The illness might have been a frank brain disease such as encephalitis or a disease condition might be inferred from subsequent evidence of degeneration of the brain. While a differential diagnosis between these

two groups might be impossibly difficult, Rutter considered that this second group represented a form of chronic brain disease and was different from Kanner's autism. The third group was characterized by onset in early adolescence or a year or so before the onset of puberty. This group of psychotic disorders appeared very like schizophrenia as found among adults. Onset in early infancy may thus be added to the syndrome of early infantile autism as an essential criterion.

Rutter (1971) suggested that the diagnosis of infantile autism should be made only when the child in question displayed each of the following characteristics:

1. autistic-type abnormality in interpersonal relationships, i.e., relative lack of eye-to-eye gaze, limited emotional attachments to people, lack of facial expression, an appearance of aloofness and distance coupled with an apparent lack of interest in people.
2. delays in speech and language development with a high probability of pronomial reversal and of echolalia.
3. ritualistic and complusive phenomena in the form of a) a morbid attachment to unusual objects, b) peculiar preoccupations, c) a resistance to change, or d) quasi-obsessive rituals.

Having thus separated out three major disorders as suggested by Rutter (1972) there remains a heterogeneous

collection of children who may also present severe learning and behavior problems. Among these are children suffering from frank neurological impairment such as the deaf, the blind, the epileptic and the spastic. There are also children who are severely and profoundly retarded and lack language who fail to qualify as autistic just as they fail to display unequivocal neurological signs. Thus there remains a sizeable heterogeneous group of handicapped children who would still remain to be characterized and possibly assisted in their problems of adaptation through a suitable therapy.

At the Fifth Banff International Conference on Behavior Modification, 1973, O. Ivar Lovaas, in an attempt to discriminate between the autistic child and the retardate at age two years, listed eight characteristics of autism:

1. engages in self-stimulating activity such as hand flapping.
2. displays apparent sensory deficit which is selective.
3. is emotionally detached and lacking in social interaction.
4. does not play normally with toys.
5. lacks language, makes no attempt to communicate.
6. has a high probability of food and sleep idiosyncrasies.
7. has some intact intelligence which may be manifest

in unusual feats of memory but is likely to be centered upon manipulating his parents.

8. fails to imitate motor acts except in the case of echolalia.

These lists of symptoms have enough in common with each other and with Kanner's 1943 account to establish a strong presumption that they are considering a highly similar population of abnormal children. However, despite considerable efforts, an unambiguous definition or description of autism as a diagnostic category does not exist. Furthermore, diagnosis in individual cases remains highly unreliable. As yet no necessary and sufficient condition or combination of conditions has been accepted as pathonomonic of early infantile autism. Given that a young child displays severely deviant behavior with marked deficits in symbolic functions and interpersonal relations a diagnosis of autism is largely a function of the perseverance which the parents demonstrate in shopping for the diagnosis. As the early labels of retardation, epilepsy with retardation, or minimal brain damage are considered and rejected by the parents, they become increasingly knowledgeable regarding criteria for diagnosis. The information they volunteer is likely to be influenced by this knowledge and to guide the conclusions reached by the physician.

Treatment Alternatives

Treatment alternatives are fewer than the multiplicity of names for therapy would suggest. The psychodynamically-oriented therapies are notable failures. Eisenberg and Kanner in 1956 concluded "psychotherapy in general seems to be of little avail" (p.560); Polan and Spencer in 1959 similarly reported that "none of the varieties of psychiatric treatment employed had any noticeable effect" (p. 198), and in 1964 Rimland also found that "no form of psychiatric treatment has been known to alter the course of autism" (p. 17). "Traditional psychodynamic methods of therapy, in all their diversity, have failed to demonstrate any reasonable degree of efficacy with psychotic children" (Leff, R., 1971). Some examples of therapies of various sorts are presented below.

Structural Therapy. There are two structures to which the term 'structural therapy' refers. First, the schizophrenic child is viewed as having a 'structural' deficit in the development of ego and superego to control his id impluses. Des Lauriers, the originator of structural therapy, suggests that this deficiency results from poor body image with fluid ego boundaries. Since the first experience of the ego arises from the establishment of the reality of body limits and boundaries, the

therapist attempts to foster its development through a therapy which provides a 'structure' as to acceptable behavior against which the child may struggle and fight (Ward, 1970). It is considered inappropriate to attempt to deal with the schizophrenic child (adolescent in Des Lauriers' cases; 1962, 1967) on an interpretive and verbal level since these levels of ego functioning are too sophisticated. Focus of therapy is upon the development of the body ego or image through an increased level of bodily stimulation. Tickling of sensitive areas, petting, hugging, swinging, in fact "Anything which the therapist can think of in a spontaneous, creative, game-like atmosphere which will aid the child in completing the differentiation of himself from the environment as a distinct and separate human being, is something which would fall under the rubric of the treatment approach labelled as structural therapy" (Ward, 1970). Language may be used in talking to the patient about his body and how attractive it is and "efforts were made to gratify any desire which the patient could be encouraged to express" (p. 96), all in aid of helping the patient cathect his bodily limits.

Des Lauriers' method (1962) was adapted to the treatment of early infantile autism by Ward (1970). Where the adolescent schizophrenic had a fragmentary body ego, the autistic child has no body ego at all and is thus totally out of contact with reality. His developmental

level is that of "behavioral ego" a more primitive level of ego development. The therapist therefore concentrates upon the behavioral ego which attempts to adapt via stereotypic activity.

In practice the therapist identifies the stereotypic behavior most characteristic of the patient. He then interrupts this behavior in as pleasant and playful a manner as possible, setting limits to the rage or avoidance reactions which are likely to follow the intrusion. These reactions are then used to focus the child's attention upon part of the therapist as a meaningful part-object or object. The child is encouraged to express his feelings toward the therapist in a verbal or physical manner. This message is then used to draw attention to the physical similarities and differences between the child and the therapist. Concentration is shifted to the child's own body and its parts to prepare for development of body ego through more fun-filled sessions of comparison between the child's body and that of his therapist. Ultimately through focusing the child's attention on bodies the behavioral ego succumbs to the body ego and the stage is set for more conventional play therapy.

Needleman and Ward (1972) published excerpts from structural therapy sessions which illustrate some of the fine points of application of this therapy:

> ----when we became particularly intrusive and tried to get increased frequency in Robert's response style, his negativism and concomitant anxiety became more manifest. He directed his aggression inward by slapping himself, which I responded to by encouraging him to slap me. He grabbed both Dr. Ward's and my head, and in a sense, literally tried to bang our heads together. In addition, for the first time Robert began to use magical spit, which he placed behind his ears to ward off our verbal intrusions into his life. This marked the first time he has used this sort of magical style, and further indicates a new source of fantasy life for him. Along with this, Robert used a good deal of hysterical laughter which we feel seem (sic) to be a defense for the underlying anxiety and depressive mood....."(p.52). This is to illustrate "that mere intrusion, without the structure of redirection, can stimulate or invite regression ... His regression was manifested by excessive anxiety which was seen in the form of hysterical laughter, strong physical aggression, and the use of "magical ear wetting" (p. 52).

Results of structural therapy with autistic children have not been published except for Ward's 1970 claim that during treatment periods ranging from two years one month to one year one month twelve autistic and schizophrenic children aged from 6-1 to 12-0 were seen twice weekly. Nine additional children were not seen on an individual basis but were exposed to the same milieu apart from private sessions. No comparisons between these groups are offered but Ward reports while thirteen of twenty-one children were receiving medication of various kinds at the commencement of the project, only two of seventeen were receiving tranquilizing medication at the time of his report. It is difficult to evaluate this information. Four children had been discharged but why or whence is

unspecified. "Several non-verbal children" had begun babbling. Of these, four had begun using words for communication.

Developmental Therapy. Schopler and Reichler (1971) use the term developmental therapy to refer to a method in which parents are taught to function as the chief therapists for their psychotic child. This is intended to foster adaptation between the child and his family and of course, has the added advantage of reducing treatment costs. Five propositions form the framework for developmental therapy: (1) the causes of autism are as yet unknown, (2) the classification remains broad but descriptively explicit, (3) biochemical and neurological brain abnormalities are the most likely causes, (4) these create perceptual inconstancies involving speech and communication impairment, and (5) parents' personalities differ from the generality only in their perplexity regarding their disorganized, psychotic child.

The therapist provides the parent with demonstrations of his own fallibility, stimulates constructive competition between himself and the parent and models appropriate behavior for them such as "how to give him a swat on the behind to clarify communication" (p.94). Similarity to Des Lauriers and Carlsons (1969) insistence upon intrusion is noted in their statement "The child is

not allowed to do anything - move about the room or use any object without the mediation of the adult" (p.94). As was stressed by Needleman and Ward (1972) competence motivation (White, 1958) must be promoted as it is the self esteem arising from repeated experience of competence which will ultimately give the child his desire to communicate.

Operant conditioning techniques are used where necessary to initiate first non-verbal and then verbal imitation, but only in those cases in which "special education is not productive." Later, contingencies are introduced to teach simple concepts. While "relatively high structure" is considered necessary to help the autistic child to respond appropriately, and "relatively unstructured play therapy is not an appropriate treatment.....", "a rapidly applied technique, such as operant conditioning, may not offer the best help for an autistic child if the rates and levels of the child's development are disregarded" (p.98).

The evaluation of this research project has not yet been published but preliminary examination revealed trends consistent with those reported by Gittelman and Birch (1967) and Rutter (1968) linking prognosis with I.Q.

While the concepts and goals of structural therapy are so vague serious attempts at evaluation must founder hopelessly. Developmental therapy merits more

consideration. While Schopler and Reichler (1971) remain tied to a neopsychiatric orientation and a concern with variables such as "competence" and "self esteem" and a "desire to communicate" their procedures are readily reduced to objective behavioral terms. They view operant conditioning narrowly and caution against disregarding the child's "rates and levels" of development, without elaborating their meaning and leaving the impression that such disregard is a serious flaw inherent in operant conditioning. They recognize a need for structure as opposed to free play; for the use of punishment to suppress unacceptable behaviors, or as they phrase it "to clarify communication"; for the active maximal involvement of the parents to foster generalization and consistency, or as they view it, to foster adaptation between the child and his family. In fact Schopler and Reichler (1971) view child development in four aspects, human relatedness, cognition, preceptual motor function and competence motivation. Human relatedness is fostered by having the therapist intrude into every act of the child. For example, as the child reaches for an object the therapist takes it and hands it to him. In time, as the child comes to tolerate this constant intrusion, a new element of frustration is introduced by demanding that the child perform some task for the therapist before completing his self-initiated act. The level of frustration thus introduced increases as does the child's ability to

tolerate frustration and as his competence grows. When the therapist has succeeded in "breaking through a child's severe withdrawal, some object or food may be used as a means of exchange." The resemblance to shaping compliance through positive reinforcement using primary or secondary reinforcement is too marked to be accepted as coincidental. This procedure is discriminable from a more conventional operant conditioning approach largely in its lack of specification of target behaviors, its lack of consistent reinforcement contingencies, and its lack of explicit discriminative stimuli to elicit the desired behaviors.

Cognition (language) training begins with non-verbal imitation as is now standard among behavioral therapies with preverbal children. The child "will then be required to look at the adult's mouth while a desired object is named before it is given to the child." Once more the technique used differs from conventional operant conditioning largely in its lack of precision. No discriminative stimulus is specified to elicit the behavior. No assessment is made of the degree or even of the fact of the desirability of the various "desired" objects. No inherent or logical connection is apparent between the target behavior, looking at the speaker's mouth, and either imitative or non-imitative sound production.

Perceptual motor development is stimulated through manipulation of the child's limbs to perform acts such as clapping. At a slightly higher level, the child is presented with selected play materials to foster motor coordination and perceptual discrimination. As viewed by Schopler and Reichler it is the exposure to these play materials and the experience of them which is the independent variable. Their dependent variable, perceptual motor development, is reported to be "uneven and sometimes unpredictable." Since the typical play of psychotic children is stereotypic and nonfunctional, increasing exposure to and experiences of a variety of toys may provide only increased time spent in equivalent, already-mastered occupations.

By competence motivation is meant the child's ability "to develop spontaneous, organized activity and play, reinforced by his own success." In this area Schopler and Reichler are particularly vague concerning procedure depending heavily upon words such as "is fostered," "is encouraged," "may develop."

A major strength of "developmental therapy" is the training of parents (generally mothers) to act as primary "developmental agents" for their children. Parents are given home programs describing objectives, methods and materials in the expectation that they will be in daily use by the parents. Sessions are held regularly in which

parents demonstrate their use of the home program knowing that they are being observed and sometimes filmed. Aside from this, parents also complete daily logs in which they rate changes in the child's responses for each section of the home program. Weekly logs are kept to rate progress in other areas of home life such as sleeping, eating or toiletting.

Since the goals of developmental therapy are (1) "to prevent the elaboration of psychotic behavior" rather than to reduce or eliminate particular behaviors, (2) "to achieve maximum adaptation between the child and his family or community" which suggests multiple interpretations of meaning, and (3) "to promote recovery where possible" rather than to teach particular skills and modes of interaction, the design of the therapy may be appropriate to its stated goals.

Group Psychotherapy. Speers and Lansing (1964; 1965) demonstrate a group psychotherapeutic approach to treatment. With autism defined as "a defense against loss of the symbiotic partner" it is difficult to reach any conclusions regarding the nature of their child population except that they were all considered psychotic and were of preschool ages.

The four children comprising the first group were

seen by a team of two therapists for three hours on Tuesdays and one and a half hours on Fridays. The families were directed to hire a nanny to devote her full time to the child in the home. The nannies were to provide complete and constant attention to the child, to cuddle, feed and play with the child at whatever level the child wished. When the nannies left at the end of their work day the mothers were to devote themselves similarly to the child for the remaining portion of the waking day. Group sessions for the mothers were conducted weekly at which they discussed their anger at the child's regression, their jealousy of the nanny and gradually "became more aware of their own narcissistic and dependency needs (which they had previously handled by reaction formation and identification in the interaction with the child)." It was concluded that the mothers had all been seriously frustrated as children, wives and mothers. This frustration engendered rage which was acted out with and through the sick child. In addition to these group sessions one mother and one father were seen by social workers once a week. The mothers' group also attended a weekly finger-painting class, the theoretical significance of which is not discussed.

As the mothers increasingly sought satisfaction of their narcissistic and dependency needs from their husbands a therapeutic group for husbands was formed. It quickly became apparent that the men had all had serious

dependency frustration too. Unlike their wives however, they experienced "murderous ambivalence" fear of which made them withdraw "sufficiently to get some slight dependency gratification." This withdrawal was manifest in their physical absences from scheduled sessions as well as their emotional isolation when physically present. That this emotional isolation was not total was evident in the occasional "explosive catharsis" which was, unhappily, without an "observing ego" to profit by it. Speers and Lansing report that "the fathers' group was a most difficult project." Since no mention is made of it one must conclude that the fathers' group did not have the benefit of finger-painting classes.

The children reacted to early group therapy sessions with enhanced withdrawal. Shortly thereafter crying, screaming, shaking, facial contortions, falling, kicking and beating occurred in one child after another. When these behaviors occurred the therapist immediately devoted himself fully to the "panicky" child. The authors report that while two of the children permitted themselves to be cuddled and helped to regress by being fed from a baby bottle, the other two resisted such treatment and had to be restrained forceably by the attending adult who immobilized the child completely for a few minutes while explaining his (the therapist's) acts and motives. When the child was released he was told that he could return if he felt himself unable to control his behavior or if the

therapist felt it necessary to impose such control again.

The frequency of these "panic" reactions increased but no actual counts were reported. It was noted that they were invariably preceded by an interruption of the 'autistic behavior' by another child. As the frequency of such episodes increased, the panicky child, with his "kicking and beating with feet and hands," came to be viewed as "fighting back aggressively." Thus these children who had previously shown "complete withdrawal from other human beings" were now attempting "to make contact with one another." Later the children learned to look at themselves in a mirror. "Clearly this was a highly effective mode of controlling disintegrative panic; aggression, however, still required external control."

It is reported that within ten sessions the children actively sought the infantile feeding situation and the therapist control of aggression procedure. Although language development in the children was described as totally lacking in one, incomprehensible gibberish in two, stereotyped phrases devoid of communicative content in one, and infantile speech with misuse of pronouns in one (total five), one of the children managed to verbalize his desire for control describing a fantasy in which he feared being eaten by a ghost. He was helped to recognize that "he was the ghost who wished to eat others."

A fifth child was added to the original group of

four. She "created intense anxiety ..... and they ganged up on her as though to eliminate her from the environment." Thus the original four were not only making contact with each other, but were now acting cooperatively as a group. "The situation was quite chaotic at this time and required the presence of a third adult in the room. Much of our activity was physical intervention, restraining aggressors and protecting those aggressed against."

As the children learned to form a group structured play was introduced. To strengthen group solidarity and reduce anxiety rhythm band was used to begin the session and as needed when tensions built up later in the session. Imitative games were played, crayons and play-dough were used, there was play with soapy water and "in the bathroom there was a good deal of fecal play, smearing and the offering of the excrement as a gift to the therapist: (sic). This was indulged to a degree, and this was obviously helpful in allowing these children to gain bowel control....."

The children ganged up on the child who practiced nudism, exhibitionism, sexual curiousity and exploration as such behavior generated considerable anxiety among them. The therapists made interpretive comments; "the children verbalized many crucial questions, for example, about the permanency of the penis." Apparently the

language development had been truly remarkable. After 18 months of therapy "Speech was communicative in all five," not simply imitative or echolalic, "and several were using understandable sentences with correct pronouns." Therapists elicit fantasy, differentiate real from not-real and correlate behavior with affect.

This combination of treatments has apparently had astounding success as during the second year of treatment four of the children were able to attend kindergarten where they were tolerated and three of them are expected to enter public school. The authors modestly report "Our experience so far permits a somewhat optimistic evaluation, and suggests that the method deserves further exploration." Unhappily, no further reports have been published.

Behavioral Therapies. Different from the psychodynamically-oriented therapies already discussed are the conditioning or behavioral therapies. These therapies apply learning principles and have provided objective evidence for the lawful change of behavior even among seriously deviant children.

Ferster and De Myer (1961) placed autistic children in a room containing automatically-controlled devices. The situation closely paralleled that of an animal in a

Skinner box in that a free operant response, lever pressing, was manipulated through discriminative stimuli and schedules and kind of reinforcement. The children demonstrated lawful changes in behavior in accordance with the principles of learning derived from animal experiments of operant conditioning. This suggests the validity of an operant conditioning approach to therapy with autistic children.

Operant Conditioning. A basic aspect of behavioral therapy is the use of operant conditioning procedures. The initial impetus for this approach to the treatment of "autistic" children was provided by the work of Ivar Lovaas and his colleagues. A most notable account of Lovaas' classic study illustrating the use of operant conditioning to develop speech among a sample of 20 "autistic" children was reported by Lovaas et al. (1973). While all of the children with whom they worked had been diagnosed as autistic by at least one agency not associated with his project, most of the children had also been labelled as retarded or brain damaged. Most of the children had already had attempts at treatment other than behavioral therapy which had proved ineffectual and their likelihood of improvement was judged to be essentially nil. About half of the children were mute; that is they emitted no recognizable words, although they did produce

sounds; the remaining half of the children were echolalic, that is they produced speech echoing that of others either immediately or following a delay, but were not able to converse appropriately. Receptive language was either absent or minimal. The children were characterized by an apparent deficit of hearing and/or vision which was not supported by medical examination, i.e., they sometimes acted as though they were deaf though they were not, as though blind though they were not. These children were characterized by severe affective isolation and a high rate of self-stimulatory behavior (responses such as rocking, spinning, twirling, flapping etc. which appear to provide only proprioceptive feedback). Social and self-help skills were minimal or absent. A few of the children displayed self-mutilatory behavior; all engaged in severe aggressive, tantrumous outbursts. Toiletting behavior ranged from trained to those who smeared feces. Because operant conditioning (or reinforcement theory) does not ascribe therapeutic benefits to the expression of self-mutilatory behavior or to feces smearing such responses were reduced in frequency during the initial phase of training. Extinction procedures or punishment through the delivery of painful electric shock or spanking were utilized as indicated by the carefully collected data on each child for each behavior under each condition. Incompatible responses were reinforced as well.

Since the work was primarily a research investigation

and only secondarily a therapeutic intervention for the child, experimental rigour was maintained to a degree not frequently found in work with patients. Two of the children, for example, were studied by means of behavioral observations utilizing multiple-response recordings beginning in June 1964 at the inception of the study and prior to the initiation of treatment. They were studied in the same stimulus setting under the same conditions and for the same period of time each month for the duration of their 14-month treatment, after which they were discharged to a state hospital for two years, recalled for a brief reinstatement of the treatment conditions (1968), returned for a further two-year period, and recalled for a second follow-up (1970). These two children were thus subjected to an A B A B A design, where B is the operant conditioning therapy and A is whatever conditions prevailed in the state hospital, that is, the no-treatment or extinction condition in a hospital which stressed "acceptance."

A further pair of children was measured four years after discharge from the project, thus experiencing an A B A design. The treatment was replicated with a second group of children who also had the A B A design, thus permitting a factorial analysis for treatment effects across subjects as well as analysis within subjects across treatments. Comparisons were also made between children who were treated in a residential program and discharged

to a state hospital and those whose parents were instructed in how to continue therapy when their children were discharged from the residential program back to the care of their parents. A third and fourth group lived with their parents throughout the treatment. The parents of the children in these groups received the most instruction.

The data reveal the importance of reinforcement in controlling the behavior of these children. Severe regression was found among children who were abandoned to the state institution whose policy of "acceptance" provided reinforcement for bizarre behavior and whose high patient/staff ratio would suggest that while their behavior was inconspicuous children were likely to be ignored. Lovaas concludes that "sick" behaviors decreased while "healthy" behaviors increased during treatment. By "sick" he means echolalic and those responses classed as self-stimulation; by "healthy" he means appropriate contextual speech, appropriate play, and social behavior. Some of the children showed "spontaneous" social interactions and verbal exchange initiation. Large increments occurred in I.Q. and social quotients of all the children largely because the children were usually found to be untestable initially and ultimately scored in the mildly to moderately defective range. Much of this change in score is attributable to extinction of interfering behaviors, but some of it is undoubtedly due

to new behavioral acquisitions. Social quotients, as assessed by the Vineland Social Maturity Inventory, similarly showed substantial gains. There were no exceptions to the improvement, but individual differences were considerable.

Lovaas apparently does not think the term "autism" is useful. It is not related to etiology nor is it indicative of treatment outcome. Reliability of application of the diagnostic label is low. Following treatment in which mute children acquired some socially appropriate responses, some were reclassified as retarded, raising the question of whether this might not have been a more appropriate diagnosis for them in the first place. Some of the children acquired simple discriminations at rates slower than that found among even severely retarded children. Even the areas of behavior showing the greatest improvement differed among children. Heterogeneity was the rule.

Operant conditioning, behavior therapy, reinforcement therapy, or behavior modification as it is variously known, is the only therapeutic intervention of demonstrated effectiveness (Hewett, 1965; Risley and Wolf, 1967; Wolf, Risley and Mees, 1964; Lovaas et al., 1973). The results have been replicated in various studies involving different centres. Lovaas concludes:

> So the principles we employ are not new. Reinforcement, like gravity, is everywhere, and

> has been around for a long time. The principles can be used to the child's advantage, or they can be turned against him. What is new in behavior therapy is the systematic evaluation of how these principles affect the child. It is not the content of behavior therapy which is new, but its research methodology. In that sense, we have an immense and often unappreciated advantage over those who preceded us, the methodology enables us to contribute in a cumulative manner to psychological treatment.

The way was thus paved for the development of a fully therapeutically-oriented, total program for deviant children.

Total Programming. These earlier experimental studies demonstrated that the behavior of psychotic children can be changed in desirable directions by the rigourous application of basic learning or conditioning procedures. Browning and Stover (1971) used these observations as the basis for a clinical approach to the treatment of emotionally disturbed children which they called "Total Programming". The first paragraph of their monograph reads:

> The scientific method must be the basis for treatment of psychologically disturbed persons. The clinician should identify and measure behavioral problems in the same manner that the physical scientist approaches any natural phenomena. As an applied scientist, the clinician should combine basic psychological knowledge with current observations of his patient to form testable treatment hypotheses. Factual understanding of the patient's behavior derived from experimental tests of these hypotheses should then be the basis for the

> design and execution of a total treatment program. Finally, the clinician should be capable of objectively evaluating his treatment procedures and, consequently, his understanding of the patients. This technological ideal is the experimental clinical method.

It is the method of observation, hypothesis formation, measurement and use of experimental design to permit evaluation of the efficacy of any particular treatment with each patient which is being urged by Browning and Stover, rather than any one type of treatment. Nevertheless, their work is rooted in the principles of learning as derived from experimental psychology because it permits objectivity, provides predictable hypotheses concerning treatment outcomes, and promotes the studying of relatively clean dependent variables.

It is not the child's ego, his personality or any other hypothetical construct, but his behavior which is analyzed to determine discriminative stimuli, reinforcement contingencies, schedules of reinforcement and other such behavioral variables, it being assumed that regardless of any physiological variables which may predispose a child to acquire bizarre behaviors, these behaviors were in fact learned. Some behaviors are accepted as self reinforcing, notably that class of behaviors Lovaas calls "self stim" including twirling and rocking. Such self reinforcement may then interact with social reinforcers to maintain responses. It is an

article of faith that ".....when the child is admitted, his referral behaviors, directly or through some indirect chain of responses, operate or are maintained by some reinforcement contingencies which are available on some unknown schedule." For any given child reinforcers may be severely limited or distinctly unusual. His behaviors for all that are acquired and maintained through interactive reinforcers and schedules which are not identified by the clinician and hence remain unpredictable to him. It is presumed that punishment of one or more undesirable responses will serve to reduce the rate not merely of the directly punished responses, but also other related acts. Conversely, if the child is permitted to engage in undesirable acts, other related acts are also subject to acceleration. This is the rational for total programming. All of the child's behaviors must be controlled to permit differential reinforcement of responses to be acquired, maintained, decelerated or extinguished.

By "total programming" then is meant "the identification and prevention of the occurrance of those stimulating and reinforcing conditions maintaining the deviant behaviors, and the systematic presentation of conditions designed and measured for their success in helping the acquisition of desirable social responses" in an "attempt to achieve continual and pervasive behavioral control." It is the combination of full, clinical responsibility and the rigorous discipline of the

scientific method in what they call the "experimental-clinical" model which is novel and of incalculable heuristic value.

Imitation and Modelling Procedures

Lovaas (Lovaas et al., 1973) used shaping to initiate speech with his group of autistic children. This is a slow and painstaking process. If a child can be taught to imitate, the foundation is laid not only for initiating speech relatively easily but also for teaching many social and self-care skills. Thus the lack of imitation which is characteristic of autistic children is a serious barrier to their acculturation.

Imitative behavior is strong in the normal child. At as young an age as eight months children may be observed imitating gestures, inarticulate sounds and the inflection of a voice (Stengel, 1947). Games such as pat-a-cake or clap hands in English-speaking families and les petites marionnettes in French-speaking families etc. are among the first arbitrary social exchanges enjoyed in the socialization process. But for much of the history of psychology investigators were content to note the phenomenon of imitation. It was counted among the innate behaviors (Bagehot, 1873; McDougall, 1908) and was thus a principle used to explain other behaviors rather than a

behavior to be accounted for in its own right. With the rise of behaviorism, psychologists became interested in the mechanisms which might account for imitative behavior. First classical conditioning (Humphrey, 1921) was proposed as the mechanism by which imitation occurred. This reflexive act was extinguished when reinforcement from the primary stimulus was withheld. Such a theory strains the Pavlovian paradigm beyond recognition. Nevertheless in denying an innate instinctive drive and seeking explanatory mechanisms men such as Humphrey (1921), Allport (1924), Watson (1925) and Holt (1931) were attempting to investigate the phenomenon.

Thorndike (1898) believed that mere observation was not sufficient to induce learning. His animal studies using chicks, cats and dogs were supported by Small with white rats, Cole and Davis with the raccoon, Watson with the monkey (Warden, Fjild and Koch, 1940). All failed to find evidence of imitation. In the case of monkeys and apes the evidence was inconsistent. Haggerty (1909) presented fairly clear-cut evidence of imitation in monkeys although it occurred in only a few of the animals with which he worked. As methodological sophistication increased so did the number of investigations which succeeded in inducing imitative behavior in monkeys and apes. In humans Thorndike (1898) felt observation might constitute a sufficient stimulus to elicit an act if and only if that act had already been learned. When the

imitated behavior is approved by the surrounding society it is strengthened.

Miller and Dollard (1941) attempted to provide a detailed analysis of the paradigms they believed to be involved. The matched-dependent-paradigm occurs when an inferior person depends upon a superior (in age, status, skill, intelligence) to isolate the stimuli which he cannot as yet discriminate. They give the example of two children one of whom discriminates the sound of his father's footsteps - the cue, and runs to greet him - the response, for which he receives a candy - the reward, which reduces his Hullian drive. The second child, happens to be running behind his brother during such an encounter while in a state of arousal, is rewarded with candy by the father and is thus reinforced for running when and where his older brother runs. It might be simpler to suggest that the younger child, like his brother, is being reinforced for greeting his father. Presumably this is precisely what is happening with the first few imitative responses which then generalize so that junior will imitate novel responses performed by big brother. Imitative learning is simply a special case of instrumental conditioning and is thus contingent upon reinforcement.

In 1960 Mowrer suggested a theory of imitation as basic to verbal learning in the child. According to his

theory the sounds which adults make while tending to an infant acquire secondary reinforcing properties through contiguity of presentation of the sounds with the comfort provided. Given that these sounds are now reinforcing, the child will increase his rate of producing them in his babble which will thus be shaped to contain the sounds of the language spoken by those who tend the child and to drop from his repertoire sounds alien to the language he will speak. Unlike the behavior under consideration by Miller and Dollard in their matched-dependent paradigm, Mowrer's responses are performed in the absense of a model and without extrinsic reinforcement.

Mowrer discusses "empathic learning" which is a much more sophisticated form of imitation. In empathic learning only the model receives a reward, the imitator observes and through empathy with the model is reinforced vicariously. Thus the ability to be reinforced vicariously is said to be fundamental to imitative learning.

Bandura (1965) was concerned to account for the ability of humans to learn new responses merely by observing a model perform them. There was no overt practice of the new responses during the acquisition phase, hence this was an instance of no-trial learning, and no apparent reinforcement was delivered to the imitator or to the imitatee. He believed that such events

illustrated the major role of perceptual and other symbolic processes in imitative learning. Internal representational responses were mediators which permitted these no-trial observationally-acquired responses to be performed upon some subsequent occasion. The crucial variables involved were: 1) attention to the model; 2) retention of the modelled events in some symbolic form; 3) motoric reproduction and 4) incentive and motivation (Bandura, 1969). It is in this fourth step that reinforcement plays an important role as it elicits performance of the observationally-learned act.

Two systems were involved in the acquisition of imitative responses (Bandura, 1969). A process of sensory conditioning occurred whereby the stimuli presented by a model to whom the subject was attending elicited perceptual responses in him. These perceptual responses become sequentially associated and centrally integrated through temporal contiguity. Through repetition imaginal representations of the perceptual responses are formed which are stored and retrievable after long delays of time.

The second representational system is verbal. Bandura uses this system to account for the speed with which human subjects can reproduce behavior and the long periods of time which can elapse between learning and performance. The observed events are coded verbally and

it is the verbal rather than the visual cognitive processes which govern imitative responses. The verbal nature of the code facilitates retrieval and reproduction. Thus according to Bandura imitative responses are an instance of S-S learning and symbolic mediation with reinforcement playing no part in the learning.

In order for imitation to be learned Miller and Dollard require the child to be engaging in behavior of the same kind and in the same place and at the same time as is a normal person. Such an eventuality is probably so rare for an autistic or severely or profoundly retarded child as to be practically inconceivable. It is certainly not an event which would occur with sufficient frequency to become a generalized imitation response.

Mowrer requires a child to be capable of secondary reinforcement in order for him to acquire language. Autistic children are characterized as lacking responsiveness to secondary reinforcement (Ferster, 1961). He also requires a child to be capable of "imitating" an emotional response of a model, a task hopelessly beyond the ability of an autistic child. According to Mowrer's formulation it is difficult to see how an autistic child could ever learn to imitate even if he were given specific instruction.

Bandura (1969) demands an ability to form mental images and to code events verbally. Autistic children do

little that would lead one to credit them with imaginal functions. They are lacking in representational play and in spontaneous artistic expression. Verbal behavior is notably lacking in autistic children, generally being absent or confined to meaningless echolalia.

Thus according to the models of imitation offered by Miller and Dollard (1941), Mowrer (1960) and Bandura (1969), an autistic child will be devoid of imitative responses. The case of Bandura's model is somewhat more complex in that if we suppose language to be acquired through imitation, and imitation to require language, we are hopelessly trapped with a child who lacks both language and imitation and cannot possibly acquire either. Given the lack of spontaneous imitation which is characteristic of autistic children only Miller and Dollard allow for even the possibility, albeit slight, of their acquisition of a generalized imitation response.

Gewirtz and Stingle (1968) departed from the trend toward mediational theories and adhered to an orthodox behavioristic model in which imitation is learned through specific instrumental training. Initially imitative responses occur either by chance or through special training. Direct reinforcement increases the strength of such responses. This accurate reproduction of the model's act is called <u>imitation</u>. When a set of such responses has been mastered the behavior class of imitative responses

acquires reinforcing properties. We may now speak of generalized imitation for novel stimuli will be imitated accurately upon initial presentation and established imitative responses will be maintained without direct or extrinsic reinforcement.

Instrumental learning is thus essential to imitation, but any particular imitative response may be performed, not because it has been reinforced, but because it belongs to a response class which has been acquired through reinforcement.

"No-trial" observational learning is accounted for by assuming that the subject comes equipped with a nearly life-long history of intermittent reinforcement for imitation in many environmental conditions. His imitation of the observed response is thus fully accounted for by his generalized imitation response.

Vicarious reinforcement is dealt with in a similar fashion. The child subject comes to the experiment with a generalized imitation response. Seeing the model reinforced increases the likelihood of his performing the same act because it acts as a generalized cue for the high probability of the availability of reinforcement for that response in that setting. Similarly seeing a model punished following a response would act as a generalized cue for the high probability of the availability of punishment for that response in that setting.

Studies of imitation in children generally work with children who attend schools of some sort. Such studies are thus confined to nursery age and older children. It is clear, however, that the normal child acquires his generalized imitation response at a younger age. Thus the claim that imitation responses are rapidly acquired (Bandura and Walters, 1963) is based upon observations of children who are old enough to have developed basic imitation skills. Naturalistic observations suggest that within the family unit the infant is deliberately taught to imitate. Many agents deliver a wide variety of reinforcements on an intermittent schedule for imitation of diverse acts. Thus imitation is taught, generalization fostered, an extinction-resistant schedule of reinforcement delivered.

The generalized imitation paradigm can be carried further to account for deferred imitation, to imitation of the model in play and to generalized imitation of the values of the model. Always the imitative behavior is possible because the child has learned to discriminate the common elements in the acts modelled in a set of related stimulus contexts. The child now has a functional class of imitation responses available to apply in new settings and in the model's absence. When he uses this paradigm in the absence of some of the discriminative and reinforcing stimuli his behavior can be called <u>identification</u>. The

child is now responding under the control of discriminative stimuli similar to those which control the behavior of the model. The critical dependent variable in a study of identification is thus the similarity between the responses of the child and the model in a structured stimulus setting. No representational or cognitive processes are involved in this consistently-instrumental explanation of imitative phenomena.

With children who are severely and profoundly retarded as with the autistic, the lack of imitation is a major handicap in learning. Baer, Peterson and Sherman (1967) were able to use learning principles to teach non-imitation retardates to imitate. The imitation response was acquired to the point that new acts were imitated upon first presentation and eventually response chains were copied without assistance. Manipulating the child to make the desired response so that it could be reinforced became basic to teaching imitation to non-imitative children.

Baer et al. (1967) suggested that their accomplishment was possible due to an isomorphism between the model and the child which was discriminated by the child following repeated episodes of matched-dependent learning. Through this discriminated correspondence the stimulus category of response similarity was repeatedly reinforced, hence strengthened, and acquired reinforcement value so that novel acts, not previously directly

reinforced would now be imitated. This study was the stimulus for the Gewirtz and Stingle (1968) theory of imitative learning.

Bandura (1969) called attention to the role discrimination processes may play in imitation. Baer and Sherman (1964), Baer et al. (1967) and Lovaas et al. (1966) worked with nonreinforced modelled responses scattered among consistently reinforced modelled responses. Bandura suggested their findings, indicative of generalized imitation, might be due to a failure to discriminate between these two classes of responses. Given conditions which made discrimination easier or which provided long-maintained differential reinforcement practices the child would stop imitating the nonreinforced responses. Bandura and Barab (1969) performed an experiment to test for the role of discrimination in imitation. Children were trained with two models one of which delivered reinforcement consistently for imitating her acts, the other model never reinforcing the few acts she modelled. Later the reinforcing model tested the children's responses to her performance of the original set of reinforced responses which she continued to reinforce, to nonreinforced motor responses embedded among reinforced motor responses as the difficult-to-discriminate condition, and to a block presentation of nonreinforced verbal responses as the readily-discriminable condition. They found that over blocks of

trials children persisted in imitating the motor responses included in the difficult-to-discriminate condition, but decreased their imitations of the discriminable nonreinforced verbal responses.

McLaughlin (1971) concluded that the Bandura and Barab (1969) study suggests "that generalized imitation is not the product of conditioned reinforcement but merely of a failure to discriminate." By definition however, generalization is a failure to discriminate just as discrimination is a failure to generalize. The Bandura and Barab (1969) study is not necessarily testing imitation at all. They may merely be teaching children who already have a broad repertoire of imitative responses that under certain conditions one subset of these responses will not be reinforced. Repeated blocks of trials are presented and the nonreinforced responses are extinguished: the children have learned to inhibit a response. Viewed in this way there is nothing surprising or of any particular interest in this study and it has little relevance to the study of the development of imitation.

Various aspects of generalization have been reviewed by Flanders (1968). Under "Effects of Antecedent Characteristics of M" (M signifying model) he lists status and degree of realism of M's performance, among other variables. Miller and Dollard's Experiment 7 (1941)

demonstrated that children can be trained to imitate an adult M and not a child M or a child M and not an adult M. They did not find any children more likely to imitate adults than other children until specifically trained to do so.

In the 1963 study by Bandura, Ross and Ross "It was predicted, on the basis of saliency and similarity of cues, that the more remote the model was from reality, the weaker would be the tendency for subjects to imitate the behavior of the model." This prediction was not supported. They found no difference between imitation following exposure to live, filmed or cartoon models. Klinger (1967) found no significant differences in imitation following live and televised presentations of the models. Hill and Liebert (1967) used films to replicate a live model study of Bandura et al (1967). Flanders (1968) concludes by reporting that "the tremendous potency of filmed or televised exposure relative to live performances is apparent."

Studies using differential reinforcement (Allen et al., 1964; Hart et al., 1968; Hartup, 1965; Patterson and Anderson, 1964) have demonstrated that reinforcement of peer interaction and either punishment or ignoring isolate play leads to an increase in social behavior. It was found (O'Connor, 1969) that about 20 per cent of nursery school children exhibited a low level of social

responsiveness. Most of these could be brought to increase their rate of social behavior through differential reinforcement. A few however, lacked social behavior entirely or displayed it so rarely as to make reinforcement unlikely to be effective.

It has been demonstrated that new responses could be added to the repertoire of a child capable of imitation when no direct reinforcement was delivered (Bandura and Huston, 1961; Bandura and McDonald, 1963; Bandura and Mischel, 1965; Bandura, Ross and Ross, 1963; Hicks, 1965). If it was possible to learn on a non-response non-reinforcement basis and if filmed display of models were potent, then it should be possible to modify the behavior of nursery school isolates merely by showing them a suitable film. O'Connor (1969) tested the efficacy of film models in increasing the level of social interaction initiated by nursery school children who had been labelled isolates. These children not only displayed deficient interactive levels but frequently withdrew into corners, closets and lockers. The observers and teachers agreed that the isolates frequently displayed active, purposive withdrawal. Although O'Connor does not refer to Mowrer (1960), it appears that his experiment was as much a test of Mowrer's concept of vicarious reinforcement as of Bandura's observational learning. In any case, the children assigned to the experimental group had private viewings of a color, sound, "T.V. program" which

portrayed a series of episodes in which a child first observes and then joins a social activity for which he is reinforced socially by the group. The child model was varied in age and sex from scene to scene. To drive the point home more fully a narrative sound track provided a commentary highlighting the relevant aspects of approach and reinforcement. Child subjects were observed for eight minutes following the viewing. While subjects who viewed a control film showed no significant behavioral change, those who watched the experimental film increased their rate of social interaction. This increase was statistically significant, occurred in each of the subjects and was of sufficient magnitude to rate scores similar to those of the non-isolates who had been observed during the pretest period.

No follow-up data were gathered, but even if the effects were only immediate, the study is of clinical significance in that it makes it possible for reinforcement to be administered frequently for behavior which previously had not occurred often enough for reinforcement to be effective.

Stotland and Patchen (1961) found that when a subject perceived a similarity between himself and a model in terms of background and personal characteristics, he displayed an increased tendency to adjust his attitudes of prejudice and authoritarianism toward those of the model.

Similarly, sixth-, seventh- and eighth-grade boys claimed to share sea-diving preferences of a diver portrayed as being similar to them in background and other characteristics more than of one portrayed as dissimilar (Burnstein, Stotland and Zander, 1961). It was also found (Stotland, Zander and Natsoulas, 1962) that subjects who were led to believe themselves similar to a confederate in musical preferences matched his choice of nonsense syllables more closely than did subjects who had been led to believe themselves different from their confederate.

In these studies it was verbal opinions and claimed preferences being modified, but on this basis Rosekrans (1967) undertock to test the hypothesis that perceived similarity to a social model would increase the degree to which instrumental behaviors were imitated by children. She used a group of boy scouts as subjects and for the high similarity group she stressed that the model was also a boy scout, fond of camping and hiking, attending the same kind of school as the subject and having the same interests and skills. In the low similarity condition the subjects were told that the model was not a boy scout, had no interest in camping and hiking, attended a different kind of school and disliked the skills and interests of the subject. A Perceived Similarity Test was administered to permit evaluation of the success of the induction procedure.

The subjects in the modelling condition were shown a film in which the model played a war-strategy game. During the course of the film the model performed a sequence of verbal and motoric acts. Both the frequency of imitation and the size of the repertoire displayed were greater when the subject perceived a high degree of similarity between the model and himself.

If it is true that increasing the similarity between the model and the subject will increase the level of imitation elicited, then logically the most efficacious model should be the subject himself. As application of a self-modelling procedure was conducted (Creer and Miklich, 1970) with an asthmatic boy who displayed several behaviors considered immature for his ten years which irritated the other children in the residence and created social problems for the boy. Stable and reliable base-line data were collected over a two-week period on the basis of which four inappropriate behavior chains were selected. Video-tapes were prepared featuring the subject, Chuck. In one, four scenes showed the four inappropriate behavior sequences. In the other there were four scenes displaying the incompatible, desirable counterparts. All scenes for both video-tapes were rehearsed as required until the experimenters were satisfied with the degree of verisimilitude obtained. Because the rehearsal might have been sufficient to modify the target behaviors a two-week period was allowed to

elapse during which no treatment was instituted. Chuck's behavior continued as it had during the initial baseline condition.

Following this for a two-week period Chuck was permitted daily to view the video-tape in which he displayed the behavior judged appropriate. "He abruptly began to exhibit appropriate behavior." When Chuck watched himself behaving inappropriately for two weeks his behavior "sharply changed again." When the tape showing appropriate behavior was again made available Chuck again reversed his behavior to make it agree with the tape currently being viewed. Although the study ended and both tapes were withdrawn Chuck continued to act in the appropriate manner for the remaining six months he resided there. It would be anticipated that once appropriate behavior was initiated social reinforcement would maintain it.

Fuller case histories reporting the use of a self-modelling technique were reported (Hicklich et al., 1972) in which the work with Chuck was one of the three cases presented. In this version however, Chuck was discharged immediately after the study was completed so no follow-up data was obtained. While problems encountered in attempting to conduct this relatively long-term research project were many and at times serious, the results imply a new technique of considerable potency for eliciting

specific behaviors may have been introduced.

Interesting questions are raised in the discussion. Since the viewers are clearly capable of performing the acts in question before they view the tapes, response learning is not at issue, nor is the role of reinforcement in learning as no direct reinforcement is involved at any time. It is then a matter of performance, not learning. When the subjects failed to imitate the many live models displaying appropriate behaviors, why did they imitate taped models? Is there something special about self-modelling which makes it take precedence over live models? While they believe that the self-modelling variable is important they raise the question of accounting for O'Connor's (1969) isolates who had failed to imitate the normally-interacting children in their nursery school class. They suggest that there may be demand characteristics to the modelling therapy which elicit a generalized imitation paradigm.

Kysela (1972-73) extended the use of filmed sequences to modify isolate behavior in a group of moderately retarded children. Where O'Connor (1969) had found 20 per cent of the children attending a nursery school exhibited levels of social interaction judged to be too low, Kysela's initial observations found that 35 to 40 per cent of the children not only failed to initiate verbal or physical approach to the teacher or the other children but

refused to respond to attempts on the part of the teacher to engage them in conversation or classroom activities. He used child models who engaged in selected group activities with which the retarded children were familiar; a group reading exercise, group puzzle-playing activities, a gymnastic exercise class, and dressing for recess to prepare a control video-tape.

A second, treatment video-tape was prepared showing the same four activities with the addition of a normal child acting the part of an isolate. A group member approached the "isolate" and succeeded in getting him to join the group. The "isolate" participated actively and smilingly for the remaining portion of the film set.

Pre and post treatment measures were made of verbal and nonverbal interactions on the part of the isolates with their teacher and classmates. Following viewing of the treatment tape the isolate retarded children raised their level of interaction with classmates and teacher to the level of non-isolate children. Neither viewing the control film nor spending an equal period of time, eight minutes, engaged in play with the experimenter had any effect on level of interaction.

While Kysela (1972-73) does not refer to similarity between model and subject directly he cites the use of "appropriate peer models" as "An improvement in the nature of therapeutic intervention...." Kysela urges the use of

reward procedures to maintain this increased social interaction.

The Current Study: Hypotheses

As previously discussed, modelling procedures using video-tapes have repeatedly demonstrated their potency in eliciting imitation of the behavior viewed. This has been found with normal children and with retardates. Since the autistic children used as Ss in this experiment had already demonstrated their ability to learn motor imitation through basic reinforcement it was hypothesized that video-taped models would be effective in eliciting the motor acts performed. Should positive results be found, modelling techniques using video-tape might provide a valuable addition to the treatment procedures used with autistic children by permitting a more efficient use of therapist time. Assuming the basic hypothesis to be correct a secondary hypothesis considered was whether using the S as his own model was more effective than using another child as the model. The experiment was designed to permit this comparison.

METHOD

Subjects

The Ss were four boys selected from among the students at the Edmonton School for Autistic Children. They were chosen because all were able to imitate simple motor acts quickly, accurately and without extrinsic reinforcement. Detailed histories follow.

1) Subject J. (B.D. September 9th, 1966) was assessed at the Glenrose Hospital, Department of Psychology on May 8th, 1971 at the age of four years eight months. At the time he displayed tantrum behavior, screaming, running about wildly, "crying" without tears, in the presence of his mother which ceased abruptly when he was alone with his examiner. His face was reported to be devoid of expression throughout the assessment period although he maintained normal eye contact. He was described as being well groomed, attractive and graceful.

Verbal comprehension was extremely limited, if present. He sat down and stood up upon command but failed to obey even such a high probability item as "take off your coat." He failed all assessment items requiring verbal comprehension or speech but succeeded on items involving physical demonstration or where the nature of the task required was "intuitively obvious" from the

materials involved. He repeated some of these tasks until physically prevented from doing so.

His mother reported that he had subsisted on a diet of macaroni, bread, milk and honey for years.

Bizarre behavior included rocking violently back and forth for hours unless prevented physically, and spitting then spreading the saliva with his right hand.

With J.'s mother as informant, J. was assessed on the Vineland Social Maturity Scale. He passed all first year items and most of the items at the second year level achieving scattered successes with items up to a ceiling at seven years. His overall rating indicated an age equivalent of three years, indicating a moderately defective range of ability.

An attempt to administer the Stanford-Binet Intelligence Scale, Form "L.M." was frustrated as J. engaged in repetitive piling of the pieces for an unmeasured "long" period before he completed a single form board. He demonstrated good eye-hand coordination and "great facility" in stacking the variously-shaped pieces, but failed to complete a simple block tower when directed by the examiner. No language skills were evident, neither identifying by touch nor attaching verbal labels.

J. achieved scattered successes between a two and three-year level, but reached a ceiling at three years six

months. It was concluded that the test was inappropriate for the child and could yield only "a wholly unreliable estimate of his intellectual potential". Medical examinations were all negative.

In January of 1973 J. was admitted to a one-month assessment period in a Communication-Behavior Program at Glenrose Hospital. It was concluded that on the rare occasions when he did respond appropriately to verbal commands his response was based upon intonation and gesture rather than words. J. had not been observed imitating either physical movements or verbal statements. He displayed "extreme withdrawal and passivity." In view of these "classically autistic symptoms" it was recommended that J. be discharged from the Communication-Behavior Program and enrolled in the Edmonton School for Autistic Children.

J. was enrolled February 26th, 1973. For the first three days he was introduced to the various activities of the School day, was observed closely, and was not on any systematic program of contingencies barring those elicited in normal social interaction.

No separation anxiety was evident when he was parted from his mother and sister. No approach behavior toward staff, children, toys or his mother or sister was observed at any time. No changes of facial expression occurred except when he was tickled and laughed.

Controlled observation established that J. did not discriminate between the sounds of a human voice, or snapping fingers or of pencil tapping. All were equally potent in eliciting a high-probability response; all were equally impotent in eliciting a low-probability response. No gestures were displayed or responded to by J. save his shaking his head in the traditional gesture of refusal when he was offered macaroni and cheese. The only scunds J. produced were occasional high-pitched, bird-like squeaks which did not appear to be attempts at communication.

No play of any sort was seen unless the materials were presented to J. as a task which was demonstrated for him to complete. In this way he did form boards and jigsaw puzzles showing an ability to persevere with and complete a task without being unduly distracted by passersby. No curiousity or exploratory behavior was displayed.

No imitation of motor acts or sounds occurred even when J. was with a group of children who were engaged in motoric imitation exercises.

Stereotypic motor behavior did not occur in the School but the violent rocking which had been reported by his parents was seen when J. was seated in his parent's car.

Generally the child was most striking in his utterly passive compliance. No behavior was self initiated. Nor did he offer resistance to any activity. The adults working with him were agreed that his failures to comply stemmed from lack of comprehension rather than refusal.

J. was put on a behavior modification program to initiate motoric imitation. Simple acts involving hands and arms were mastered in the first training session. The first imitative sounds were elicited in the second. This rapid rate of advance had been maintained and at the time J. took part in this experiment he had a demonstrated receptive vocabulary of 49 nouns and 15 verbs in the present participle form. He was also able to use "yes" and "no" appropriately.

2) Subject B. (B.D. January 21st, 1965) has a history of abnormal behavior dating officially from age twenty-one months when he was referred to a psychiatrist with his mother having realized that he was not developing normally when he was nine months of age. At twenty-one months B. was diagnosed as "mentally deficient (idiopathic)," although it was noted that no definite intellectual assessment could be made due to his youth. It was reported that B. was amazingly adept at spinning balls and wheels and would sustain such activity for hours. The Cattell Infant Intelligence scale was attempted but could

not be completed. The Vineland Social Maturity Scale placed him in the moderately defective range of functioning. He already presented behavior problems such that his mother was asking for assistance in learning how to handle him.

Speech developed at age three and was echolalic. B. was examined by a paediatric neurologist in August of 1969 following two "mild seizures" one of which was associated with fever. The E.E.G. report concludes "This record contains distinct epileptiform characteristics." Dilantin was prescribed and the epilepsy is totally controlled.

B. was rejected by a school for aphasic children after a trial period of one year on the grounds that they could not cope with an "autistic" child. The school director referred B. to the Guidance Clinic in Calgary. The psychiatrist there concluded that B. "presents many of the signs of autistic withdrawal from early infancy," that "overall functioning is at a severely retarded level but he shows some 'islets of intelligence'," that "he showed no interest in normal toys or other children and preferred solitary repetitive activities" and that there was probably "some degree of organic impairment." At this assessment it was noted that B. "rarely copies anyone."

One month later the Edmonton Public School Board referred B. to a psychiatrist in Edmonton who prepared a lengthy and detailed report of B.'s behavior since birth

concluding "The behavior that the parents describe and the observations that I made of the child in my office make it clear that this child has in fact a severe form of early childhood autism."

Three months after this, in January of 1971, B. was assessed at Glenrose Hospital. The Stanford-Binet Intelligence Scale demonstrated B.'s tendency to engage in repetitive, non-functional acts such as tapping and banging blocks together rather than stacking them. When he was shown pictures of objects in an attempt to elicit labelling he only said "picture" for each item. It is not reported if the word "picture" was being echoed from the question, but it seems likely that the question might have been "what is this picture?" in which case the child was displaying echolalia which was not reported. B. failed to complete any of the items at the two-year level.

The Vineland Social Maturity Scale, with B.'s mother as informant, revealed a severely defective range of mental ability. The Denver Developmental Screening Test placed B. between the thirteen and fourteen-month level. His chronological age was six years.

It was concluded that while B.'s behavior appeared bizarre it was so only in relation to his chronological age and was suitable for a child of fifteen to eighteen months. They saw "no autistic features" in his behavior other than those typically seen in the behavior of an

infant or severely retarded child. There were no "islets of intelligence."

B. was already enrolled at the Edmonton School for Autistic Children when it initiated behavioral engineering in May of 1972. At that time his behavior was bizarre in the extreme. Intricate and amazingly dexterous finger play occupied much of his day. This activity was interrupted at irregular intervals while he forcefully slapped the back of his neck or slapped his hands. During these times his long tongue was likely to be protruding while he grunted repeatedly. During such episodes B. appeared completely absorbed in his behavior and oblivious to others.

Tantrums were frequent and prolonged. Rare "good days" when only five or six tantrums occurred were interspersed among ordinary days when fully 40 per cent of the six-hour school day was spent with hands pressed over his ears while he screamed and ran furiously about.

No normal play of any kind occurred and attempts to engage him in normal play invariably led to tantrums.

Occasional speech occurred usually on an echolalic basis. This could be combined with motoric imitation as when the model touched her nose and said "nose" and the child did likewise. B. was responsive to people, watched their faces closely and frequently responded to their

attention by becoming wildly excited, laughing and hooting. Public masturbation while he laughed at passersby was another frequent disruptive behavior.

All of B.'s bizarre and disruptive behavior was more frequent, more intense and more sustained in his family setting than at School.

B. was put on a program designed to curtail tantrum behavior, exhibitionism, and echolalia and to strengthen imitation. No spontaneous solitary play was ever observed but B. would attempt to initiate imitation with adults as a favoured passtime.

3) Subject C. (B.D. January 31st, 1963) is described by his parents as having been "high strung" and easily startled by loud noises. He used a few words at about twelve months of age but shortly afterward he became "quiet," "anxious" and "cautious". He was distressed at anything new or different and was quick to replace household items which were not in their usual places. He apparently spent much of his time tapping surfaces with his hands. His parents interpreted this as testing and attributed it to his caution. His play consisted mainly of raising toys, sand, or water, to his cheek and allowing them to drop. This activity was sustained for long periods of time.

At age three years C. had not yet acquired any

communicative language. At that time a paediatrician in Edmonton was consulted. He reported that C. was physically normal and healthy. Because it was reported that C. came from another room when called he concluded that "The boy understands and hears well....." Temper tantrums had become a problem as the associated head banging had resulted in two black eyes. Peer interaction was absent. Mimicing had never been seen. During the examinatien the child ignored the physician and his speech. The parents said this was the way C. reacted to people at home as well.

A skull X-ray was negative.

It was concluded that nothing further should be done for a period of six months, at which time C. would be reassessed if it seemed necessary.

At six years nine months, October 1969, C. was assessed at Glenrose Hospital. The Cattell Infant Scale yielded a mental age of one year six months and hence an I.Q. of 22. The Vineland Social Maturity Scale placed C. at about the third year level. It was observed that C. responded to the sounds of a toilet flushing and voices echoing in a stairwell by placing his hands over his ears. C. responded appropriately to "come here" and "sit down" but it was uncertain whether he was in fact responding to the words themselves. The report also notes that even gestures seem poorly understood. C.'s mother was reported

to have informed the examiner that he "understands everything." C. failed to select common articles when requested to do so. He spat on the floor, tried to eat a rubber band, put his fingers down his throat and made himself vomit. During the examination his fingers were forcibly removed from his throat repeatedly. He ignored people in general and faces in particular. Activities he appeared to find pleasurable were rhythmic tapping of his fingers, whirling, and light flicker.

Occasional outbursts of inappropriate speech were noted. These statements were rarely completed and were never accompanied by eye-to-face contact.

It was concluded that C. was severely handicapped both in intellectual functioning and social behavior.

C. was referred to a neurologist. Medical findings were negative. His history was reviewed and it was noted that he had grown physically, that "the primary autistic behavior patterns are unchanged," that he would not use speech, was not testable and responded unpredictably to sound. It was also reported that C. "has achieved a greater degree of emotional independence" but this is not tied to behavior and it is difficult to interpret.

At age seven years six months C. was admitted to a psychiatric station for observation purposes. During his stay in hospital C. "was observed to exhibit most of the

features of the early childhood autism syndrome." His mannerism of holding objects up to his cheek and then dropping them was sustained for hours on end. No useful communicative speech was displayed. He banged his head against the body of a staff member. Object use was nonfunctional and repetitive. He "tried to spit at the examiner." No real relationships with anybody developed. C. spent much of his time playing with the toilet on the ward. He defecated in the bathtub and in the swimming pool and smeared his feces in the bathtub. He whined in a high-pitched voice upon occasion. Speech was confined to brief, angry phrases such as "what the hell," "you God damn," and "Oh God," uttered in a noncommunicative, parrot-like fashion.

On the Vineland Social Maturity Scale he scored two years two months. Unsuccessful attempts were made to administer the Stanford Binet and the Draw a Man Test. It was not possible to establish an I.Q. score. The tester concluded "global retardation in language and motoric expression."

The psychiatric diagnosis was "Early Childhood Autism." Prognosis was judged poor in view of his limited mental ability and lack of useful speech at his age.

When C. was seven years eleven months of age his head banging and face slapping had become an acute problem and applications for commitment were filed. It was noted

that C. was functionally retarded to the infantile level but displayed motor maturity and curiousity appropriate to his age. "He appears interested in many experiences, setting him apart from the primarily retarded child, but is unable to function normally in terms of these experiences."

Shortly thereafter the Alberta Society for Autistic Children was formed with C.'s parents among the founders and C. among the original group of children at the School. There was general agreement between the descriptions of C.'s behavior as reported by the various agencies and as observed at the School. In addition C. was seen to initiate vocal imitation games in which he pressed his hands against the cheeks of his 'client' holding his face close to theirs while he, the 'speech therapist' pronounced the vowel "i" or "o". According to C.'s parents this was close imitation of the procedure followed by a speech therapist who had worked with C. This is the only instance of deferred imitation noted. It was not possible to reverse the roles and have C. imitate a sound initiated by someone else.

Spontaneous speech of the sort noted in earlier descriptions of his behavior were recorded: "did you do that," "aw C "(his name), "you God damn," "oh no," "you God damn stick it up," "God damn bugger," "fuck off," "get out and stay out." These utterances were poorly

enunciated and never appeared to be directed at people. They were frequent when C. was alone in a room or looking out a window.

There were no unequivocal instances of language comprehension although it is possible that he understood a few commands such as stand up, sit down, open the door, close the door. C. was extremely attentive to directional cues provided by the eyes of the speaker and to facial expressions of approval, hence given a high probability command by an unsophisticated worker C. was likely to make the correct response even if he failed utterly to understand the words spoken.

The mannerism of raising objects to his cheek and then dropping them was noted and was sustained until C. was prevented from continuing. Mischievous spitting was a frequent response to a new attendant and was accompanied by smiles, laughter and direct eye contact as was spilling of beverages or carefully pouring them onto inappropriate surfaces. C. also attracted attention by grabbing at the breasts of any women who were within reach.

Normal play was solitary and confined to gross physical activities such as running and skipping.

C. reacted to loud noises and frustration by covering his ears with his hands and gritting his teeth or, more intensely, by head banging, slapping at his

cheeks and screaming.

C. was put on a program to eliminate socially disruptive behavior and to initiate simple motoric imitation, rapidly moving to combined act and sound production. In marked contrast to his spontaneous speech, this imitative speech production involved his trunk and head in a thrusting motion and appeared laboured with a strong tendency to whisper. While sound production remained difficult, at the time C. participated in this study he imitated promptly and without systematic reinforcement.

4) Subject R. (B.D. March 28th, 1963) was assessed at Glenrose Hospital Department of Psychology in January of 1973 at the age of nine years ten months. The Stanford-Binet Scale of Intelligence, Form "L.M.", yielded an estimated I.Q. of "below 30" placing R. in the severely retarded range of intelligence. The Hiskey-Nebraska Test of Learning Aptitude was administered with comparable results.

Multiple bizarre mannerisms involving his hands and his hair were evident. He spoke in phrases and short sentences but this speech had no apparent relationship to his immediate surroundings. When asked a question he echoed it back but occasionally followed his echo with an answer. He struck the examiner as "visually

distractible." On the basis of this examination it was recommended that he not be admitted to their Communication-Behavior Program on intellectual grounds as "the prognosis for improvement in terms of learning skills or demonstration of logical thinking is very poor." Tantrums occurred and involved throwing things, kicking, screaming, scratching and pinching.

Little is known of R.'s early childhood other than the fact that he spent three unproductive years at a school for retarded children. His family was very unstable and it was suspected that he had been battered on several occasions. These suspicions were not reported to the police or investigated. His mother, an alleged alcoholic, left the city with a friend, abandoning R. who is now a ward under the protection of the Department of Health and Social Development.

R. was enrolled at the Edmonton School for Autistic Children June 14th, 1973 at age ten years three months. He was observed to engage in bizarre hand and finger play, to avoid eye contact, to lack normal play with toys. He showed no approach behavior toward adults or children. He did toilet himself independently at appropriate intervals but more frequently engaged in activities with the water and paper towels such as washing the walls or repeatedly flushing the toilet.

Except for saying "I have to go to the bathroom"

spontaneously, R.'s speech was confined to echoing what was said to him and to short, angry utterances such as "fuck off." Tantrums, in which ear-piercing screams were emitted, were R.'s most probable response to any attempt tc direct his activities toward learning situations or to suppress his echolalia in favor of conventional verbal exchanges. R. had fair comprehension of simple basic language. R. also evidenced a delight in rhythm both in his manner of finger and hand play and in his appreciation of music and poetry.

Apparatus

The experiment was carried out in a room approximately 9' x 12' which was divided into quarters by 1 inch strips of green tape which adhered to the floor. A one-way viewing mirror measuring approximately 30" x 48" had been installed so that the experimental room could be viewed ccmpletely from an adjoining darkened office. A Sony Trinitron video monitor with a 10" x 7 1/2" screen was centered on the floor against a wall facing the length of the room. This was connected to a Javelin tape recorder VTR 200. Half inch Kavex Silverchrome videotape was used to record and play back the appropriate portions of the viewing program.

The interval of music used to attract the Ss

attention to the monitor was selected from the N.B.C. Background Music Library and consisted of the first 60 seconds of "Half-Time March."

All of the toys used in this experiment were readily available commercially. There were a Lego set of 20 5 cm. x 2.5 cm. red and white plastic pieces, 100 standard 1.5 cm. diameter marbles, a set of 12 4.5 cm. wooden blocks with either a letter, a numeral or a picture portrayed on each surface, and a set of 18 3.7 cm. interlocking plastic cubes. One 16 oz. size can from Hills Bros. coffee and one Huntley and Palmers Biscuit tin were provided as well, one containing the marbles, one empty.

Experimental black and white video-tapes of each of the Ss engaging in the selected play pattern for 60 seconds were prepared through the use of modelling, verbal command, food reinforcement when deemed necessary, and judicious editing. The video camera used was a Sony AVC 3200. Two of the Ss were taped while marble dropping; two, while block stacking. In this way a 60-second tape of each S performing the task for the self modelling condition was obtained and a tape of the other of the two Ss assigned to that task was obtained for the other modelling condition. The toys were arranged on the floor of the experimental room one set in each quadrant. These were rotated clockwise following each session.

Observers were equipped with Hanhart 1 jewel stop

watches, clip boards, data sheets and ball point pens.

Procedure

The experimental room was prepared with one toy set in each quadrant and with the video monitor connected, focused and functioning so that its operation was controlled from the adjoining office.

The S was escorted to the experimental room and left alone there. Once the S was alone with the door closed the monitor began broadcasting a 60-second interval of martial music. This was accompanied by a rhythmic flicker pattern for all of the Ss except for B. whose initial reaction to it was petit mal and evident distress. After the initial exposure B. was run without the preliminary attention signal for this reason. The intended function of this 60 seconds was to focus the S 's attention on the monitor screen and all of the Ss including B. watched it intently throughout the modelling program.

Immediately following the attention signal the monitor presented a scene in which a child either stacked the building blocks or transferred marbles from one coffee can to the other. These were the two target toys and the two patterns of play being modelled for the Ss. In one condition the child saw himself as the model. In the other condition he saw one of the other Ss modelling the

play pattern. This play was sustained for 60 seconds at the end of which the monitor became blank and silent. The S remained in the room for a further five minutes while the two observers in the adjoining room independently recorded his behavior from behind the one-way viewing screen. Such sessions were held with each S five times each day at 30-minute intervals. Between sessions the Ss participated in the normal school routine.

To control for any effect which might have been obtained by the procedure involved in preparing the video-tapes, a base-line period of assessment was held which differed from the experimental periods only in the content of the program carried by the monitor. During the base-line period whatever happened to be being broadcast at the moment on the regular commerical television channels was shown for 60 seconds as opposed to the prepared video tape of the selected model and task which was shown during the experimental periods.

The experiment proper consisted of three periods of five consecutive school days each. During the first week one child in each pair observed himself (self modelling), and the other viewed his partner (other modelling) perform one of the two tasks. During the second week the tape of the other S was viewed, thus reversing the self-other modelling conditions. During the third week the original conditions were reinstated. In this way one member of

each pair was exposed to the sequence self-other-self while the other member was exposed to the sequence other-self-other (Table 1).

Dependent Measures

During the experiment there was a total of 57 experimental days (Table 10) each with 5 observation periods yielding a total of 285 observation periods. For the base-line observations (Table 2) there were 51 periods making a total of 336 observation periods in all. During each observation period each of the two observers recorded the time spent in proximity, imitative play and non-imitative play. Thus the total number of category-observation periods was 1008 for each observer. Of these 1008 measures there were only six instances in which the values recorded by the observers differed. In two instances the difference was 30 seconds and in four instances the differences ranged between 6 and 16 seconds. Dividing the number of agreements by the number of agreements plus disagreements yields a coefficient of reliability of 0.994. This is a suspiciously high reliability rating and suggests that the observers may have influenced each other's judgement.

One stop watch was used to time the five-minute observation periods following the video viewing. It was

TABLE 1 Experimental Outline

		Week 1	Week 2	Week 3
Task 1	Subject A	Self	Other	Self
	Subject B	Other	Self	Other
Task 2	Subject C	Self	Other	Self
	Subject D	Other	Self	Other

kept on a window sill below the one-way mirror so that it remained within the field of vision of the observers. In addition each observer was supplied with a stop watch which was used to measure the duration of each episode of proximity, imitative and nonimitative play.

Proximity consisted of the total time spent by each S wholly within the quadrant containing the target toy. This was included in the design of the experiment as a possible index of weak involvement.

Contact was the total time spent by each S touching any part of the contact toy with any part of his body, clothed or unclothed. Contact thus includes both imitative and nonimitative play with the target toy.

Imitative play was defined as the time spent by the S utilizing the target toy in the manner modelled. This was the desired outcome of the modelling procedure.

Non-imitative play included any activity involving the target toy other than that modelled.

A typical data sheet recording one day's observations on two subjects is reproduced in Fig. 1.

WEEK II

Date July 24
Recorder Jeb

SUBJECT	AREA	PROX	IMITATIVE	NON-IMITATIVE	OTHER
9:30	4	5:00	0:00	3:25	0:35
10:00	1	4:21	0:00	3:15	0:39
10:30	2	1:25	0:00	1:22	3:35
11:00	3	4:34	0:00	4:15	:26
11:30	4	5:00	0:00	5:00	0:00
B					
other.					

Comments: 10:00 Appears hurl marbles. Impul - tortures like behavior - throwing marbles about.
1:30 B beg to put marbles in his mouth

9:40	4	6:00	0:00	0:00	5:00
10:10	1	5:00	0:00	0:00	5:00
10:40	2	5:00	0:00	0:00	5:00
11:10	3	1:09	0:00	1:09	3:51
11:40	4	0:00	0:00	0:00	5:00
R					
self					

9:40 R one of dolls at TV which on and then
within minute of 10 R picked up blocks & played with about
Comments: 10:40 R played with Lego blocks
11:15 Using possible shot in front of TV

FIGURE 1. Typical data sheet containing the information recorded by one observer during a single experimental day with subjects B. and R.

Experimental Design and Statistical Analysis

The purpose of this experiment was to determine the effect of two classes of video-taped models on the behavior of autistic, non-imitative children who had been given special training to acquire the ability to imitate. A three-factor design was employed with self-modelling and other-modelling as the two values of the modelling variable, block stacking and marble dropping as the two values of the task variable and the third variable, subjects, of whom there were four nested within the task variable (see Winer, 1962, p. 184 et. seq.). Two of the Ss experienced each task. It was thus impossible to evaluate any unique effects of a subject by task interaction which was assumed to be of negligable interest for the purposes of a statistical analysis.

Unavoidable absences on the part of two of the Ss led to loss of some of the observations. For the purposes of computing the analysis of variance with unequal numbers of observations the method proposed by Edwards (1968, p. 264 et. seq.) was employed.

As is apparent from Table 1 other factors could have been considered, e.g., Weeks 1, 2, and 3 as one factor of the sequences of self-other-self as opposed to other-self-other as another factor, etc. In view of the limited number of Ss available and the negligable importance of these factors to the purpose of the study it was decided

not to remove these possible sources of variance from the error variance. In this way the statistical analysis is more conservative as seems appropriate. The data were examined nonetheless to see whether these factors made an obvious contribution to the error variance.

Preliminary observations determined that the Ss tended to ignore almost all play materials yielding a zero base-line for the acts selected for this experiment. Because of an anticipated base-line of virtually zero, any time spent in the modelled manner of play would be sufficient to yield a statistically significant increase. A more meaningful outcome would be whether the gain in play time was sufficient for the procedure to be considered an effective teaching technique for these studies. Obviously this involves a value judgement based on a comparison of the cost, (time, effort and money) involved in this procedure relative to outcome versus the cost-benefit ratio of other teaching methods. This issue will be considered further in the Discussion section of the paper.

Assuming the basic hypothesis to be correct, the next question considered was whether using the subject as his own model was more effective than using another child as the model. The experiment was designed to permit this comparison.

It was also considered that the Ss might not imitate

the modelled play but might nevertheless be drawn to the target toy for a non-imitative mode of involvement or, at a minimum, to the quadrant of the room containing the toy. For this reason the two additional measures of 'contact' and 'proximity' were made during the experiment and the resulting data analyzed as were the data obtained for imitative play.

RESULTS

Preliminary Observations

The target toys were among many others in the School's playroom to which the children were exposed and among which they were instructed to select a toy a minimum of twice daily. Throughout the period of their attendance, ranging from two weeks to two years, none of the Ss had ever been observed to select these toys or to play with them in the manner modelled. It was because of the very low probability of such play that these acts were chosen for the experiment.

Prior to making the experimental video-tape, all the Ss were observed for a period of one School week, five days, in the School playroom in which the target toys were conspicuously displayed on separate tables as opposed to the previous toy shelves. During this week only one of the Ss was observed playing in the manner to be modelled. The child C. stacked blocks for a total of 147 seconds.

Following this preliminary observation period the experimental video-tapes were prepared using verbal instruction, manipulation and reinforcement. To control for any effect this experience may have had, systematic basal observations were made in the experimental room under the conditions which were to prevail during the experiment except for the content of the program displayed

on the television monitor. These observations were made approximately four weeks following the taping sessions. The data collected from these observations are presented in Table 2.

Since all of the time spent by a S wholly within the quadrant of the room which contained the target toy was counted as proximity random movement on the part of the S would be expected to yield approximately 25% of the observation time in proximity. As will be noted in Table 2 all of the Ss spent somewhat less than the expected time in proximity. S J.'s behavior in this respect was peculiar in that he maintained essentially the same position and posture throughout. By chance he happened to be sitting in the quadrant containing the target for only one five-minute period. Unfortunately he continued this form of behavior throughout the entire experiment.

Following the preparation of the tape and in the experimental room all of the Ss save J. did show some involvement with the target toy as indicated by the figures headed Imitative and Non-Imitative play. S C. spent more time in non-imitative play than he did in proximity. He achieved this by carrying the toy to a different quadrant of the room. This behavior was not repeated during the experimental weeks.

TABLE 2

Base line observations made in the experimental room prior to the modelling experiment but after the subjects had been used to make the videotapes. Figures in brackets represent the % of observation time the subject spent in the indicated category.

Subject	Day	Observation Time (sec)	Proximity (sec)	Non-Imitative Play (sec)	Imitative Play (sec)
R.	7-9	1500	489	105	0
	7-10	1500	308	129	48
	7-11	1500	292	10	34
	7-12	1500	218	48	0
	7-13	1200	242	57	0
	$\bar{x}$	1440	309.8 (22%)	69.8 (5%)	16.4 (1%)
B.	7-9	1500	318	82	0
	7-11	1500	75	0	0
	7-12	1500	223	0	0
	7-13	1200	130	57	0
	$\bar{x}$	1425	186.5 (13%)	34.8 (2%)	0 (0)
C.	6-14	1200	158	0	0
	6-15	1500	163	357	4
	$\bar{x}$	1350	160.5 (12%)	178.5 (13%)	2 (0.1%)
J.	6-14	1200	300*	0	0
	6-15	1500	0*	0	0
	$\bar{x}$	1350	150 (11%)	0 (0)	0 (0)

* Subject did not move about room and was in the proximity quarter of the room in only one 5 min. session on day 6-14.

TABLE 3

Imitative Play for Two of the Subjects (C. and R.)

Week	Observation Time (sec)	Total Imitative Play (sec)	% of observation time
Baseline	9,900	86	.009
I	15,000	654	.044
II	13,500	82	.006
III	13,500	125	.009

Imitative Play

A major objective in a modelling procedure is to produce imitative responses from the S. Time spent by the Ss in imitative play was observed and recorded throughout the experiment. Results obtained were as follows:

One of the Ss (J.), totally failed to engage in imitative play. A second S (B.) had a total of three seconds for the entire experiment including the base-line observation period. The remaining two Ss (C. and R.) did engage in some imitative play. Since this imitative play time was slight the results for the two Ss were added together for all experimental conditions and base-line. These are presented in Table 3. As can be seen only a small part of the observation time was spent in imitative play. This increased slightly during the first experimental week but returned to base-line or below for the other two weeks. Obviously the modelling procedure did not elicit imitation.

Proximity vs. Play Time

The two remaining dependent measures in this experiment were proximity and non-imitative play time. Because the time spent in imitative play was so slight and apparently was not an effect of the experimental manipulation it was decided to combine the times spent in

imitative with the time spent in non-imitative play. The total play time thus derived was plotted on the same graph as was time spent in proximity for each of the Ss (Fig. 2-5).

Although there was wide variation in response patterns displayed by the Ss it is apparent that proximity was not the result of random movement about the room. Since each test day provided 1500 seconds of observation time random movement would yield a mean proximity time of 375 seconds per test day with random variation about that time. Only the pattern presented by S C. approached that expectation. T-tests were done comparing the observed proximity time with the expected value mentioned above. The results are presented in Table 4. Only the T value for S J. was significant at the 5% level but the standard errors of the means were large as were the confidence intervals on the base-line observations (Table 2). A similar comparison was made for the base-line observations for Ss R. and B. In neither case were the T values significant at the 5% level of confidence.

A much more obvious relation was that between proximity time and the total play time for each S on each experimental day. The strength of this relationship was tested by determining the correlation coefficient between these two values for each of the Ss. The values obtained are given in Table 5. The correlation coefficients were

TABLE 4

Proximity time for subjects during experimental observations. (t values derived for expected proximity time of 375 sec/observation day.)

Subject	Proximity Time (sec) mean ± standard error	95% Confidence Interval	df	t
R.	515.4 ± 111.3	$754.1 \geq \mu \geq 276.7$	14	1.261
B.	596.3 ± 110.1	$832.5 \geq \mu \geq 360.1$	14	2.010
C.	312.8 ± 60.2	$444.0 \geq \mu \geq 181.6$	12	1.034
J.	149.2 ± 48.5	$254.0 \geq \mu \geq 44.2$	13	4.654*

* Significantly different at the 0.05 level.

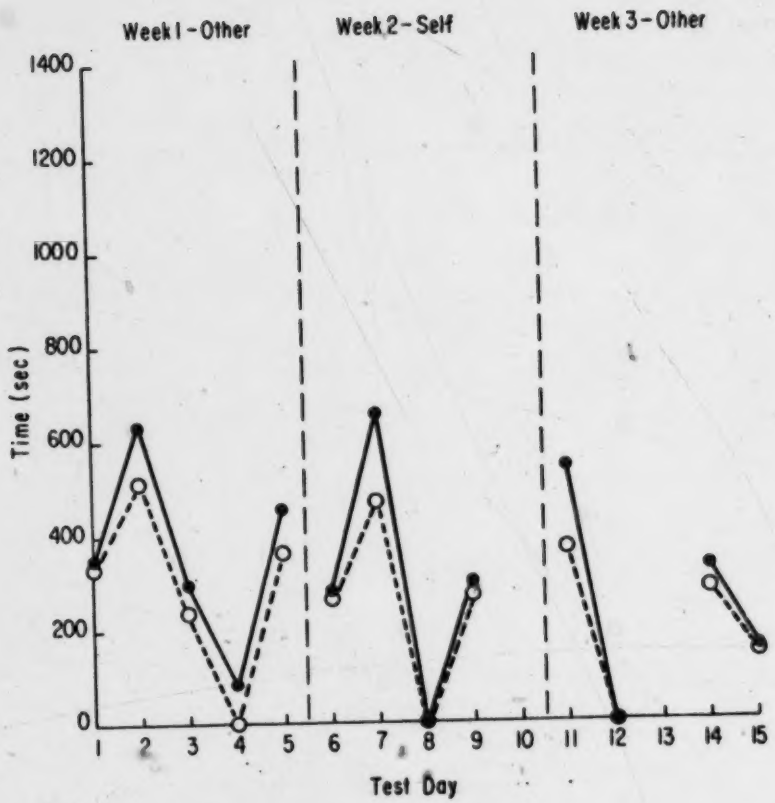

FIGURE 2. Comparison of proximity time with play time for Subject C. Experimental observations: ●, daily proximity time; o, daily play time (imitative + non-imitative play).

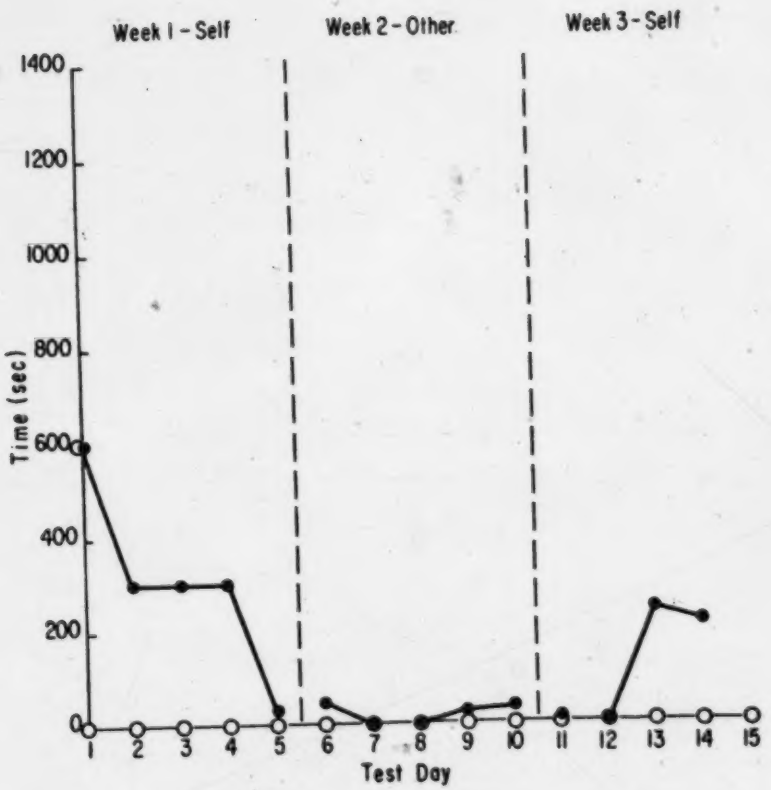

FIGURE 3. Comparison of proximity time with play time for Subject J. Experimental observations: ●, daily proximity time; o, daily play time (imitative + non-imitative play).

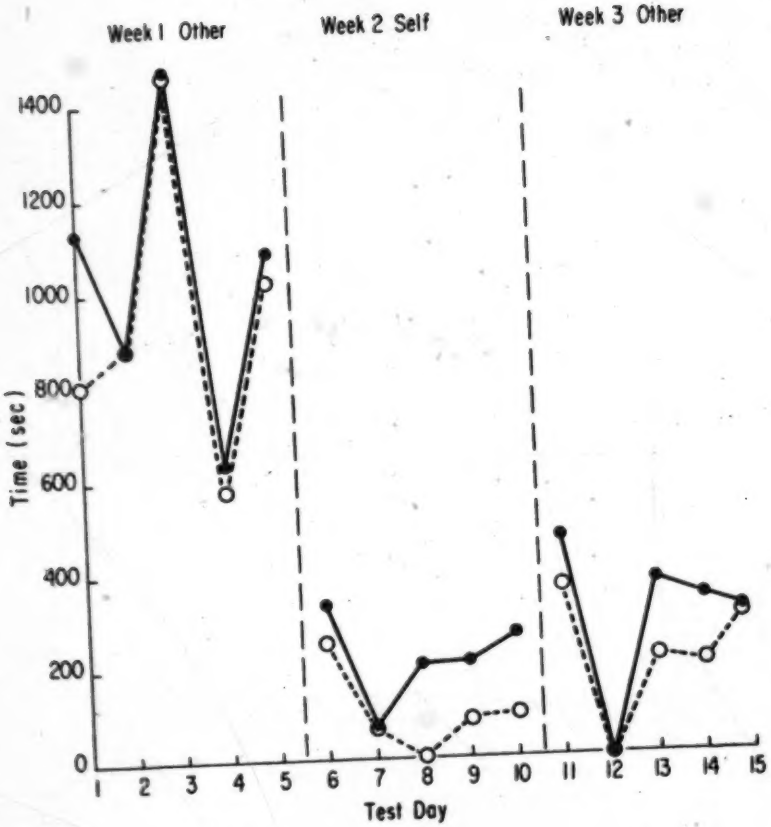

FIGURE 4. Comparison of proximity time with play time for Subject R. Experimental observations: ●, daily proximity time; o, daily play time (imitative + non-imitative play).

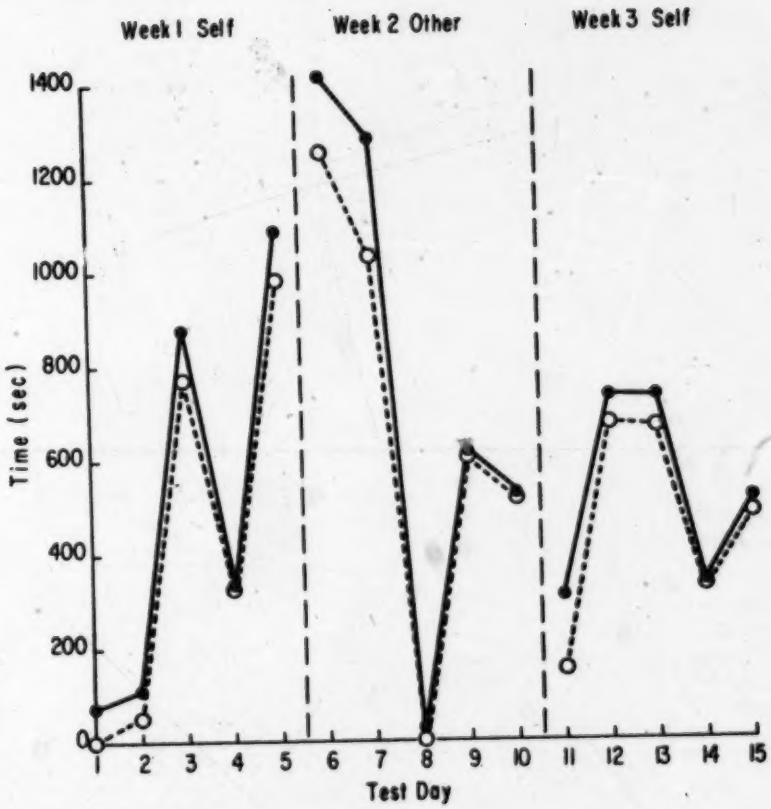

FIGURE 5. Comparison of proximity time with play time for Subject B. Experimental observations: ●, daily proximity time; o, daily play time (imitative + non-imitative play).

close to one, except for S J., indicating that proximity and total play were not independent measures of effects produced by the experimental treatments.

The correlation coefficients for the base-line observations (Table 2) on Ss R. and B. were respectively r=0.106, df=3 and r=0.570, df=2. In neither case were the r values significant at the 5% level of confidence. This indicates that prior to the experimental manipulation the factors of proximity and total play time with the target toy were independent.

Effects of Experimental Conditions on Total Play Time

The observational data gathered during experimental weeks 1, 2, and 3 are listed in Tables 6-9. Since, as mentioned previously, imitative play occurred so rarely it was decided to combine imitative with non-imitative play as total play time for the purposes of analysis. These results are summarized in Table 10. An analysis of variance of these results is listed in Table 11. F values significant at the 5% level were found for the self-other comparisons, for the comparisons among Ss and for the comparison between the two tasks. In view of the total zero performance of S J. the significant differences found between tasks and among Ss is not surprising. Since the experimental design left Ss nested within tasks it was

impossible to analyze for the significance of a S x task interaction which might have been responsible for the significance found between tasks as suggested by the data.

An analysis was computed for the S x self-other interaction. Since this interaction was not significant there is no reason to doubt the independence of the significant difference found for the self-other factor from an effect for Ss. In contradistinction to the secondary hypothesis of this experiment, it was the other model which elicited more play than did the self model.

TABLE 5

Correlation between proximity time and play time.

Subject	Proximity (sec) $\bar{x} \pm S_{\bar{x}}$	Play (sec) $\bar{x} \pm S_{\bar{x}}$	df	Correlation Coef. (r)
R.	515.4 ± 11.3	418.8 ± 112.7	13	.977*
B.	596.3 ± 110.1	522.8 ± 100.0	13	.990*
C.	312.8 ± 60.1	250.9 ± 47.2	11	.972*
J.	149.2 ± 48.5	0	12	0

* Significant

TABLE 6

Observations for Subject C. on Task I (Blocks)

Week	Condition	Day	Observation Time (sec)	Non-Imitative Play (sec)	Imitative Play (sec)	Total Play (sec)
1	Other	1	1500	190	145	335
		2	1500	351	163	514
		3	1500	136	103	239
		4	1500	0	0	0
		5	1500	297	65	362
2	Self	6	1500	247	34	281
		7	1500	427	37	464
		8	1500	0	0	0
		9	1500	262	11	273
		10	-	-	-	-
3	Other	11	1500	368	0	368
		12	1500	0	0	0
		13	-	-	-	-
		14	1500	282	0	282
		15	1500	111	43	154
		$\bar{x}$	1500	205.5 (14%)	46.2 (3%)	251.7 (17%)

TABLE 7

Observations for Subject J. on Task I (Blocks)

Week	Condition	Day	Observation Time (sec)	Non-Imitative Play (sec)	Imitative Play (sec)	Total Play (sec)
1	Self	1	1500	0	0	0
		2	1500	0	0	0
		3	1500	0	0	0
		4	1500	0	0	0
		5	1500	0	0	0
2	Other	6	1500	0	0	0
		7	1500	0	0	0
		8	1500	0	0	0
		9	1500	0	0	0
		10	1500	0	0	0
3	Self	11	1500	0	0	0
		12	1500	0	0	0
		13	1500	0	0	0
		14	1500	0	0	0
		15	-	-	-	-
	$\bar{x}$		1500	0	0	0

TABLE 8

Observations for Subject R. on Task II (Marbles)

Week	Condition	Day	Observation Time (sec)	Non-Imitative Play (sec)	Imitative Play (sec)	Total Play (sec)
1	Other	1	1500	764	40	804
		2	1500	880	0	880
		3	1500	1,327	138	1,465
		4	1500	574	0	574
		5	1500	1,010	0	1,010
2	Self	6	1500	250	0	250
		7	1500	67	0	67
		8	1500	0	0	0
		9	1500	80	0	80
		10	1500	94	0	94
3	Other	11	1500	278	82	360
		12	1500	0	0	0
		13	1500	207	0	207
		14	1500	195	0	195
		15	1500	296	0	296
	$\bar{x}$		1500	401.5 (27%)	17.3 (1%)	418.8 (28%)

TABLE 9

Observations for Subject B. on Task II (Marbles)

Week	Condition	Day	Observation Time (sec)	Non-Imitative Play (sec)	Imitative Play (sec)	Total Play (sec)
1	Self	1	1500	0	0	0
		2	1500	45	3	48
		3	1500	770	0	770
		4	1500	326	0	326
		5	1500	983	0	983
2	Other	6	1500	1,248	0	1,248
		7	1500	1,035	0	1,035
		8	1500	0	0	0
		9	1500	614	0	614
		10	1500	512	0	512
3	Self	11	1500	147	0	147
		12	1500	673	0	673
		13	1500	667	0	667
		14	1500	336	0	336
		15	1500	483	0	483
$\bar{x}$			1500	552.6 (35%)	0.2 (.01%)	552.8 (35%)

TABLE 10

Summary of Results Obtained for Total Play Under Various Conditions

Subjects	Task I (Blocks) C. $\bar{x}$	C. n	J. $\bar{x}$	J. n	Task II (Marbles) R. $\bar{x}$	R. n	B. $\bar{x}$	B. n	Σ	n
Self	252.0	4	0	9	98.2	5	443.3	10	793.5	28
Other	250.4	9	0	5	579.1	10	681.8	5	1511.3	29
Σ(Subjects)	502.4	13	0	14	677.3	15	1125.1	15	2304.8	57
Σ(Tasks)			502.4	n=27			1802.4	n=30		

(x=sec/day; n=number of experimental days)

TABLE 11

Analysis of Variance Applied to Total Play Time;
Imitative & Non-Imitative Play

Source	df	MS	F
Self-other	1	64,404.6	4.776*
Subjects	2	162,241.3	12.031*
Subject x self-other	2	39,835.1	2.954
Error	49	13,484.9	
Tasks	1	123,587.4	20.697*
Tasks x self-other	1	10,150.5	1.700
Error	49	5,971.4	

* Significant at the 5% level.

DISCUSSION

As mentioned previously, the target toys were specially selected because the Ss consistently ignored them in the playroom situation for the entire time of their attendance at the School which ranged from two weeks for S R. to two years for Ss C. and B. With the start of systematic collection of base-line data in the experimental room several changes occurred. First, during the course of preparation of the experimental video-tape various means were used unsystematically to induce the children to utilize the target toy in the manner required. Second, the Ss were isolated in the experimental room as opposed to being exposed to the cacophony of sights and sounds and the presence of both children and adults which normally prevailed in the playroom. Further the experimental room contained only the four sets of toys, each being featured in its own quadrant of the barren room. Any or all of these factors plus other less obvious changes may have contributed to the fact that two of the four Ss showed some imitative play and three of the four showed non-imitative play during the basal observation period.

As shown in Table 2 (base-line observations), the time spent in proximity for each of the subjects was somewhat less than anticipated on the basis of random roving about the room. For the experimental results

(Table 4) proximity time was considerably higher than expected for two of the Ss and considerably lower than expected for one of the Ss. Only for the latter S (J.) was the result significantly different from the expected proximity time due to random movement about the room. On the other hand, an interesting difference was noted between the base line and the experimental results in that in the former there was no significant correlation between total play time and proximity, while in the latter, three of the four Ss gave data yielding high, statistically-significant correlations. This correlation strongly suggests that the experimental tapes did in fact effect a change in the behavior of three of the four Ss in respect to their location in the experimental room.

Originally proximity was conceived of as a measure of weak involvement with the target toy. The results of both base-line and experimental observations imply that this was not the case. During the basal period proximity was not significantly different from random movement about the room and, in fact, was slightly less than would have been expected (Table 2). During the experimental observation periods (Table 4) proximity time was still not significantly different from expected although for two of the four Ss it was higher than the time expected on the basis of random movement. Since it cannot be said that a lack of significant difference establishes that there was no difference, it is at least possible that the lack of

significance is attributable to the large standard errors of the means. As is indicated by the high correlation coefficients in Table 5 proximity time is almost totally accounted for by total play time. This correlation analysis also indicates that proximity is not a measure of weak involvement with the target toy.

It was originally anticipated that there would be virtually no play of any sort prior to the experimental observations. Base-line observations confirmed this expectation (Table 2). In such a case even a very small increase in play time would have yielded results of statistical significance. Statistical significance can be achieved well below the threshold for clinical significance. Impressive increases were in fact recorded for S R. (Table 8) and S B. (Table 9). On the other hand, for S C. (Table 6), for whom there were limited base-line observations, the anticipated increase did not occur, while S J. did not engage in any play, either in the base-line observation period or during the experimental observation period.

The data for total play time during the experimental observations (Table 10) and the analysis of variance applied to these data (Table 11) provided some very interesting results. It is hard to know whether the significant difference found between tasks was due to an actual difference in the amount of imitative behavior

elicited by the tasks *per se* or whether the apparent difference stems from the Ss. Since Ss were nested within the tasks variable the statistical analysis permits no judgement regarding this issue. The zero response time of S J. who of course experienced only one of the tasks prompts a strong suspicion that the apparent difference noted is more attributable to Ss than to tasks. Since interest in the applicability of the particular tasks used in this experiment to a modelling procedure was negligible, the problem raised by this factor is inconsequential for the purposes of this study.

The work of Stotland and Patchen (1961), Burnstein, Stotland and Zander (1961), Stotland, Zander and Natsoulas (1962), Rosekrans (1967), Creer and Miklich (1970), Creer and Miklich et al. (1972), Kysela (1973) and Kysela and Zelhart (personnal communication) suggest that perceived similarity between model and S serves to increase the strength of the imitative response. For this reason a self-other comparison was included in the experimental design. It was found that a significant difference was recorded for this variable, a difference which was independent of Ss as witnessed by the lack of significance of the Subjects x Self-Other interaction. Surprisingly, however, the difference was in the opposite direction from that indicated by studies demonstrating the efficacy of increasing similarity. There was significantly more imitation during the Other condition than during the Self.

The studies conducted by Stotland and his colleagues and also that of Rosekrans manipulated the degree of similarity of models to Ss but never employed a self-modelling condition. The studies conducted by Creer and Miklich (1970) and by Miklich et al. (1972) employed only a self model. A comparison of the relative merits of self and peer has not previously been made with any Ss. It is thus impcssible to say whether the superiority of peer models to self is a peculiarity of these psychotic Ss or is more widely found. This would be an interesting ccmparison to pursue with normal Ss. The economies of time and effort permitted by the use of normal child models as opposed to the use of the psychotic child as his own model are sufficient to make this comparison of considerable clinical significance.

A brief glance at the total play duration for each of the Ss throughout the experiment (Fig. 2-5) reveals an obvious difference for each S . For example S C. (Fig. 2) presents a random variation about a mean line which was almost parallel to the abscissa (i.e., independent to test day). S J. (Fig 3) simply had no play time. With S R. (Fig. 4) the response pattern appeared to follow a negatively decelerated course and finally S B. showed a roughly bell-shaped curve. Given such a peculiar set of circumstances it would be most surprising if the variance attributable to Ss were not significant. The individual

performances will be discussed further below; the striking aspect at this point is the vivid illustration of Lovaas' finding of heterogeneity as a major characteristic of results of work with such children (Lovaas et al., 1973).

It has not been established that the Ss recognize their own reflections, although all are normally exposed to mirrors in their homes as well as occasionally at School. If in fact they do not recognize themselves in the video-taped program, then in imitating their peers in preference to themselves, they would be imitating the more familiar image. The possibility that the Ss failed to recognize themselves suggests a striking difference between them and non-psychotic children.

Basically the aim of the modelling procedure was to achieve imitation of a video-taped model and not merely to increase the attraction which an object held for a S. As such, it was a failure (Table 3). Using only the data from the two Ss who can be said to have imitated at all, the base-line and the final experimental week were identical in the proportion of time spent in imitation.

S J., to judge from the data, appears to be vegetative (Fig. 3). In fact, however, he had been responding to conditioning most satisfactorily and in the five months which elapsed between his beginning therapy and the end of the experiment, had progressed from a non-imitative, mute, impassive, unresponsive child to one who

was capable of instant imitation, whose expressive language had gone beyond imitation to meaningful labelling of articles and actions in terms of short chains such as "sitting down," and whose receptive language skills included compliance to simple commands involving the same set of articles and actions. His speed of acquisition of new responses was continuing unabaited and boded well for his prognosis. The data imply that J. waited for adult delivery of stimuli to elicit adult-approved classes of behavior. Disapproved behaviors such as spitting, squealing and rocking which had formerly occurred without apparent adult stimulation, had already been decelerated to the point that they were seen only rarely at school. Lacking adult direction as to what response was desired, J. lapsed into a state of almost total inactivity and reverted to the expressionless child he had been upon initial admission to the program. Except for his lack of self-mutilative behavior, J. displayed all of the traits which suggest the label "autistic."

S C. is also quite classically autistic. While J. and C. share most traits, C. alone was self mutilative, engaging in face beating to the point that he frequently bruised his cheeks. Upon occasion he also crashed his head into any available hard surface such as walls, tables or doors. Like J., C. responded well to operant conditioning and quickly learned to imitate simple motor acts and then, more slowly, sound chains. Unlike J., C.

did not acquire the ability to label articles or acts, nor did his receptive language progress beyond compliance to a few simple commands.

In the present experiment C. also differed from J. in that he did engage in play, both imitative and non-imitative. Thus this factor of presence or absence of play under the experimental conditions is not an indicator of diagnosis any more than it appears to relate to prognosis or, for that matter, to intelligence.

R.'s diagnostic category is less certain than that of J. and C. largely because of the lack of information regarding his early childhood. His behavior regarding play with the target toy was distinctly odd. This ten year old boy rolled the marbles on the floor, scolding them when they failed to follow his spoken commands regarding movement and direction. This behavior might be regarded as imaginative fantasy, but it lends itself equally well to a categorization as confusion between living and inanimate objects. Neither categorization carries any explanatory merit. The fact is that whatever interest he had in the target toy diminished rapidly following the first experimental week although the modelling continued (Fig. 4).

The behavior of B. was also quite bizarre. Most of the experimental observation time was occupied by B. licking the one-way observation mirror and engaging in

rapid, intricate finger play. When marbles were incorporated in his usual finger play the duration was scored as non-imitative play. His imitative play was a mere three seconds out of a possible 22,500 seconds, a most unimpressive score.

As discussed previously one consideration in this study was whether the modelling procedures employed would effect a change in the behavior of these children in a desired direction. The results obtained indicate that this was achieved in three of the four children. Some of the factors affecting this change in behavior have been analyzed, described and discussed. An equally important consideration is whether the results obtained would seem to justify the use of this technique in the future treatment and training of these and other similar children. The answer to this would have to be 'no'. The primary reason for this negative answer lies in the almost complete lack of imitation elicited by the procedure employed. In a play situation such as that examined in this study it may not seem so important a problem. The amount of play with the target toy was increased. This could be considered a successful outcome. However, as a device to be utilized in teaching basic skills such as self-feeding with cutlery, it is obvious that mere increased activity with the food and cutlery would be quite unsatisfactory. The ultimate landing place for the morsel of food might be unsuitable in the extreme.

A further consideration was the efficiency of utilization of staff time achieved using this method as opposed to more conventional behavioral techniques. Had it been successful it would have permitted a considerable saving of staff time. Moreover the observation that peer models were superior to self models further suggests the feasibility of normal child models being used to prepare the videotapes, thus producing an even greater efficiency in utilization of staff time.

Initial reports of studies utilizing filmed live or cartoon characters were not attempting to teach new skills to the child Ss. They were simply determining whether, without special training, the Ss did imitate (Bandura, 1969). The consideration was whether the behavioral repertoire of children was affected by their television and movie viewing. Subsequent studies making clinical applications of this work (O'Connor, 1969; Kysela, 1972-73; Miklich et al., 1972) followed quite directly the procedures established by the initial studies.

With the population of children utilized in this study, as with most descriptions of autistic children elsewhere, a dominant characteristic is their lack of imitative behavior without special operant conditioning to initiate it. This type of special training was conducted with the Ss in this experiment to the point that all would readily imitate a live adult model. From that point on

they were treated as were Ss in the modelling studies mentioned above. To increase the probability of success of this modelling technique an important intermediate step might be included. The Ss should be specifically trained to imitate video-taped models before attempting to establish new skills through this medium.

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